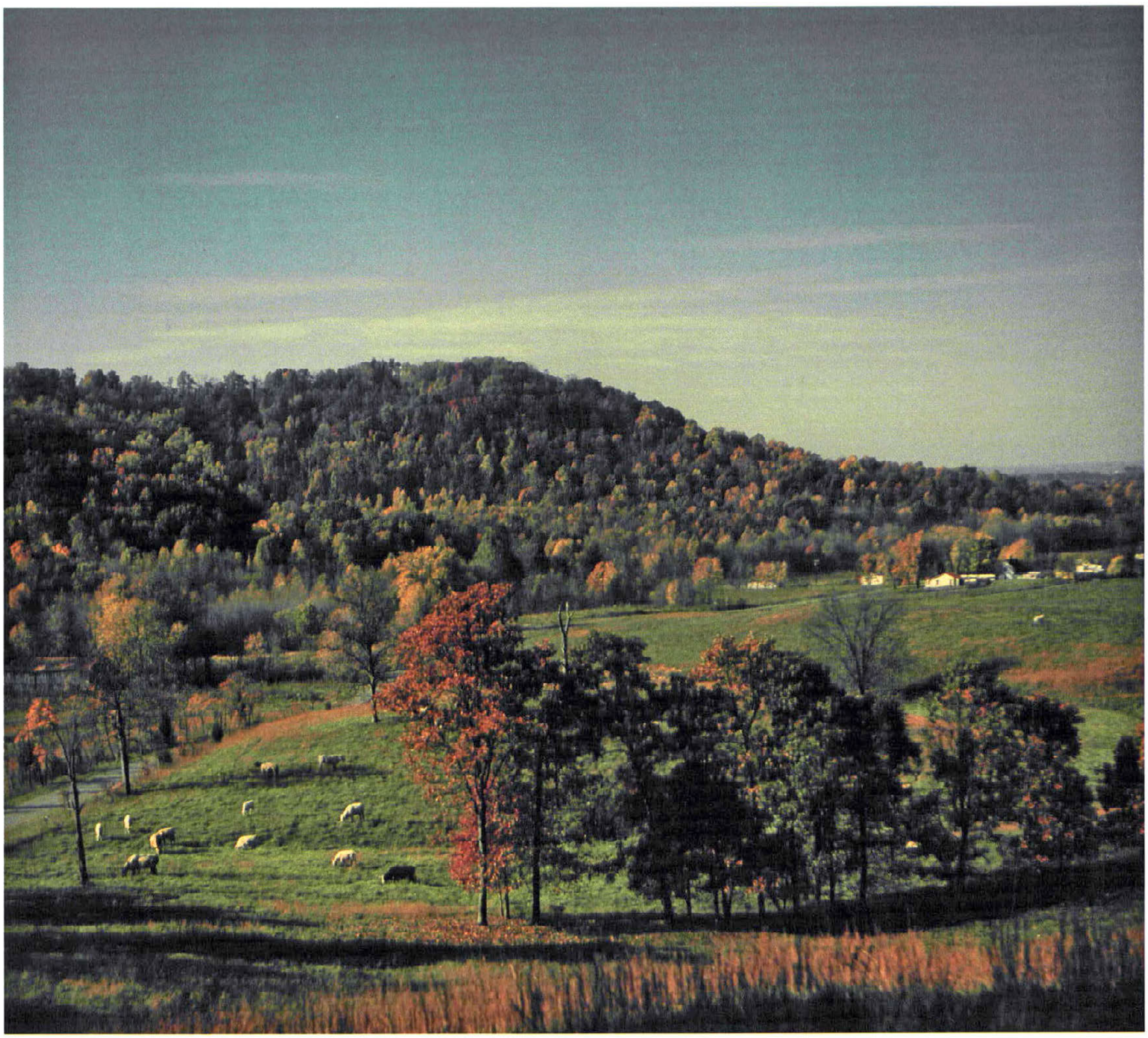
United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Kentucky Natural
Resources and
Environmental
Protection Cabinet,
Kentucky Agricultural
Experiment Station,
and Lewis County
Conservation District

Soil Survey of Lewis County, Kentucky



How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

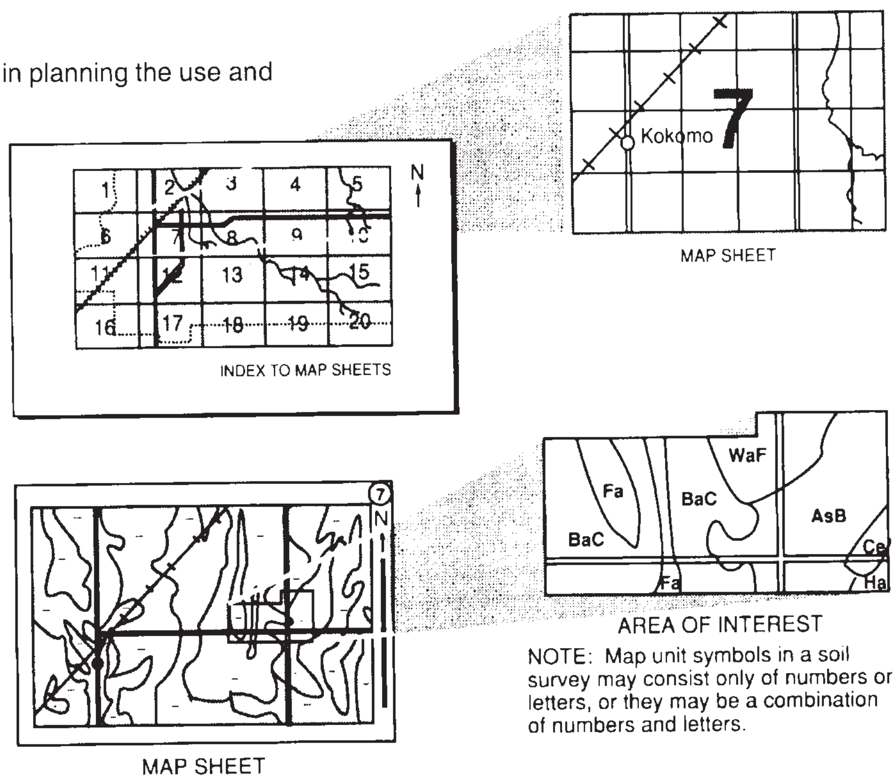
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1988–95. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1995. This survey was made cooperatively by the Natural Resources Conservation Service, the Kentucky Natural Resources and Environmental Protection Cabinet, the Kentucky Agricultural Experiment Station, and the Lewis County Conservation District. The survey is part of the technical assistance furnished to the Lewis County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Cattle grazing in an area of Covedale-Trappist silt loams, 12 to 20 percent slopes, eroded. The buildings and road are in an area of Newark silt loam, occasionally flooded, and the woodland is in an area of Covedale-Trappist silt loams, 20 to 55 percent slopes, eroded.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov.

Contents

Issued 2004

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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Soil Survey of
Lewis County, Kentucky

By Steve E. Jacobs and Richard D. Jones, Natural Resources Conservation Service

Fieldwork by Steve E. Jacobs, Richard D. Jones, and Douglas B. Dotson,
Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Kentucky Natural Resources and Environmental Protection Cabinet, the Kentucky Agricultural Experiment Station, and the Lewis County Conservation District

LEWIS COUNTY is located in the northeastern part of Kentucky, along the Ohio River (fig. 1). It has a land area of 309,205 acres, or about 484 square miles, and a water area of 7,838 acres (U.S. Department of Commerce 1983). It is the 13th largest county in Kentucky. The Ohio River makes up the northern boundary of the county, while the remainder of the county is bordered by Carter, Fleming, Greenup, Mason, and Rowan Counties. In 1994, Lewis County had a population of 13,254 and the population of the county seat, Vanceburg, was 1,752 (Kentucky Cabinet for Economic Development 1995).

Growing tobacco, dairying, raising livestock, and producing timber are the main enterprises in the county.

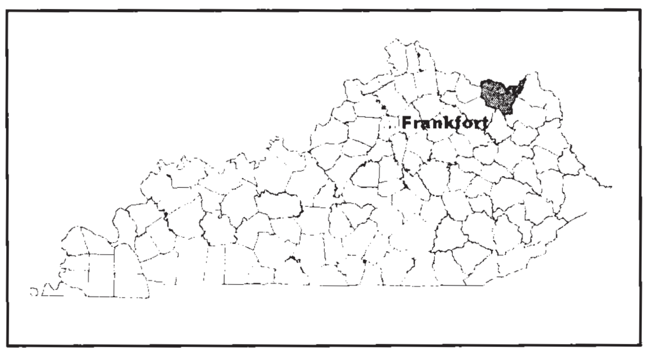

Figure 1.—Location of Lewis County in Kentucky.

General Nature of the County

This section gives general information about Lewis County. It describes farming, history and settlement, climate, natural resources, and topography and drainage of the county.

Farming

The sale of farm products accounts for much of the income in Lewis County. In 1992, there were 909 farms in the county. The average size of these farms was 176 acres (Kentucky Agricultural Statistics Service 1994). A total of 22,991 acres, or about 7 percent of the acreage in the county, was used as harvested cropland. About 17,000 acres of this cropland, or 74 percent, was used for hay (fig. 2). Most of the hayland was planted to Kentucky 31 fescue and orchardgrass. About 17 percent of the hay grown in the county was alfalfa. The areas of hayland and pasture in the county support mixtures of grasses and legumes. The most common grasses used in pastured areas are Kentucky 31 fescue, Kentucky bluegrass, and orchardgrass. Red and white clovers are the primary legumes used in the pasture mixtures.

The principal crops grown in the county are tobacco, corn, soybeans, and winter wheat. Burley tobacco is the chief cash crop. In 1993, the county ranked 40th in Kentucky in total production of burley tobacco, producing more than 4.5 million pounds (Kentucky Agricultural Statistics Service 1994). Corn is grown for both silage and grain. Most of the winter wheat is grown as a cover crop.

Figure 2.—A hayfield of red clover and orchardgrass in an area of Lawrence silt loam.

Dairy farming is the leading livestock enterprise in the county, followed by the raising of beef cattle. In 1993, milk production was 23 million pounds in Lewis County, which ranked 28th in the State for milk production. Horses, sheep, poultry, and goats are also raised in the county.

History and Settlement

The history of Lewis County originates with that of the State of Kentucky. Vanceburg was one of the landing places for immigrants that came down the Ohio River from Pennsylvania to the hunting grounds of Kentucky (Kleber 1992).

The first horses brought to Kentucky were landed from a flat boat at the mouth of Salt Lick Creek. A marked trail was found there that led from the saltworks at Vanceburg, up the creek past Burtonville, to the Cane Ridge settlement in Bourbon County.

Lewis County was formed from a portion of Mason County on December 2, 1806. It was named in honor of the explorer Meriwether Lewis, who, along with William Clark, led an expedition to the Pacific Northwest during the period 1803–06.

The earliest settlers in Lewis County arrived in the region in the 1770s. By 1840, the population of the county was 5,873, and by 1990, it had grown to 13,029. Agriculture has been important in Lewis County since the earliest settlements were established. The cultivation of tobacco began in the county around 1875, after the introduction of the white burley variety. In 1870, farmers in the county harvested 369,855 bushels of corn. The early settlers also grew wheat, flax, and hemp. Farming is still the main enterprise in the county.

Climate

Prepared by the National Climatic Data Center, Ashville, North Carolina.

In Lewis County the summers are hot in the valleys and slightly cooler in the hills. Winters are moderately cold. Rainfall is fairly heavy and is well distributed

throughout the year. Snow falls nearly every winter, but the snow cover usually lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Maysville, Kentucky, in the period 1961–90. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 32 degrees F and the average daily minimum temperature is 22 degrees. The lowest temperature on record, which occurred on January 29, 1963, is -19 degrees. In summer, the average temperature is 73 degrees and the average daily maximum temperature is 85 degrees. The highest recorded temperature, which occurred on July 7, 1988, is 105 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 44.6 inches. Of this, about 24.25 inches, or 54 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 3.66 inches at Maysville on August 26, 1967. Thunderstorms occur on about 45 days each year, and most occur in July.

The average seasonal snowfall is about 6.9 inches. On February 2, 1966, two records were set for the period of record. One was for the greatest snow depth, 17 inches, at any one time, and the other was for the heaviest 1-day snowfall of 8.3 inches. On the average, 15 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 63 percent of the time possible in summer and 43 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11.3 miles per hour, in March.

Natural Resources

The most important natural resources in Lewis County are soil, water, timber, limestone, siltstone, shale, and sandstone. Of these resources, soil is of great importance. Resources of minor extent include sand and gravel. Of minor note, on Salt Lick Creek near Vanceburg, there was, at one time, a bed of copperas (a green, hydrated ferrous sulfate that could be used to make certain inks) and an extensive bank of blue clay suitable for making stoneware and firebrick. Also, zinc has been discovered near the mouth of Quicks Run but has not been mined.

Domestic water demands are generally met by ground water and surface water supplies in the county. Most of the incorporated towns and many rural areas are served by community water systems. Wells and cisterns provide water to many farmsteads. Farm ponds, small lakes, and streams throughout Lewis County provide water for livestock, some irrigation, wildlife, and fishing. Watering facilities for cattle are also developed from the many local springs, the most noted of which are McCormick, Escalapia, and Glen Springs at the head of Salt Lick Creek and Kirk Springs near Burtonville. The salt wells that were predominant during the 1840s near Vanceburg have long since been abandoned, and the charcoal remains of the salt furnaces are indicators of their exact location. The Ohio River, in addition to supplying most of the domestic water used in the area, also provides a source of opportunities for camping, fishing, and boating. The Kinniconick Creek is well noted for muskie fishing.

Lewis County has about 219,200 acres of forest land (fig. 3), or nearly 71 percent of the total land area (USDA Forest Service 1989). Timber production contributes significantly to the economy with a number of logging operations and sawmills located throughout the county. The primary trees harvested are northern red oak, white oak, yellow-poplar, hemlock, white ash, and some black walnut and hickory. Eastern redcedar is harvested for fenceposts and some kinds of lumber.

The Newman Limestone Formation crops out extensively along the county line between Lewis, Carter, and Greenup Counties. It occurs as 3- to 10-foot-thick cliffs and has been quarried in the past as a source of road material, concrete, aggregate, agricultural lime, and flux (USGS 1976).

Beginning in 1883, refractory clay in the Olive Hill Clay Bed of Crider was mined for use in the manufacture of refractory bricks and other ceramic products (USGS 1975b).

Building stone has also been quarried from prominent siltstone and sandstone beds in the lower part of the Borden Formation at several localities along Briery Branch. The beds are hard, even-bedded siltstone and very fine grained sandstone. The even-bedded sandstone of the Borden Formation has been used locally in the construction of retaining walls, bridge abutments, and fireplaces and as riprap.

For many years, the Ohio Shale Formation and its stratigraphic equivalents have been studied as

Figure 3.—A stand of chestnut oak in an area of Colyer-Trappist silt loams, 12 to 60 percent slopes, eroded.

possible sources of petroleum. Analyses indicate the availability of as much as 10 gallons of oil per ton of shale near Charters (USGS 1965b). In addition, the shale contains traces of gold, silver, and uranium. None of these resources, however, is of economic importance under present technological and market conditions.

Sand and gravel are dredged locally from the bed of the Ohio River and used for general construction purposes. Their use as high-grade concrete aggregate is hindered by the deleterious amounts of chert, coal, and weathered clasts. Eolian sand, which is in scattered areas along the Ohio River in Lewis County, is also suitable for some construction purposes. The sand is well sorted, fine to medium grained, and noncalcareous. The alluvial gravel along most of the large streams in the county can be used as fill or as surface material for secondary roads.

For additional information about the geology of the county, see "Physiography and Geology," which is included in the "Formation of the Soils" section.

Topography and Drainage

Lewis County has a diverse topography. It includes parts of four physiographic regions and a section of the Ohio River valley flood plain. The Outer Bluegrass Physiographic Region in the western part of the survey area is characterized by broad, gently sloping ridgetops, moderately sloping and moderately steep side slopes, and moderately wide or wide flood plains. The gently sloping and moderately sloping ridgetops and flood plains are used for row crops or hay, and the moderately sloping and moderately steep side slopes are used as pasture or woodland.

The Knobs Physiographic Region in the west-central part of the county is characterized primarily by a narrow band of conically shaped hills (knobs) and long, moderately wide ridgetops breaking to very steep side slopes separated by narrow or moderately wide valleys. The gently sloping to moderately steep ridgetops are used for row crops, hay, or pasture, and the very steep side slopes and knobs are mostly used as woodland.

The southern part of the Outer Bluegrass and Knobs Physiographic Regions is drained by the North Fork of the Licking River, which is in the southwestern part of the county and forms part of the Lewis-Fleming County line. The northern part of these two regions and the eastern part of the Knobs region are drained by Cabin Creek, Crooked Creek, Quicks Run, and Salt Lick, which are in the northeastern part of the county and flow into the Ohio River.

The majority of Lewis County is in the Mississippian Plateau and Eastern Kentucky Coalfields Physiographic Regions, which are characterized by long, narrow ridgetops and very steep side slopes separated by narrow valleys. These regions are almost entirely used as woodland, with small, less sloping areas on ridgetops and the wider flood plains used for row crops, hay, or pasture. All but a small area of the Mississippian Plateau Physiographic Region, which is in the northeastern part of Lewis County, is drained by the Kinniconick Creek, the largest stream in the county. The Kinniconick Creek drains north to the Ohio River and draws its flow from the watersheds of Montgomery, Trace, and McDowell Creeks in the east, Laurel Fork and Grassy Fork in the south, and Indian and Briery Creeks in the southeast.

The elevation in Lewis County ranges from 485 feet along the Ohio River at its western exit from the county to more than 1,360 feet on peaks in the south-central part of the county, along the Fleming-Lewis County line.

For more detailed information, see “Physiography and Geology,” which is included in the “Formation of the Soils” section.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries (Soil Survey Division Staff 1993).

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research (Soil Survey Division Staff 1993, Soil Survey Staff 1975).

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of

management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs (Soil Survey Staff 1996). Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management. Soil boundary lines completely join with adjoining counties, but the composition of the map units are different due to design and changes in concept.

1. Wheeling-Nolin-Otwell

Very deep, nearly level to steep, well drained and moderately well drained soils that have a loamy or silty subsoil; on flood plains and terraces along the Ohio River

Setting

Landform: The Ohio River valley and mouth of small streams that empty into the Ohio River, along the northern boundary of the county
Slope: 0 to 30 percent

Composition

Extent of map unit in the county: 4 percent
Composition of map unit:
Wheeling soils—40 percent
Nolin soils—13 percent
Otwell soils—8 percent
Minor soils—39 percent

Soil Properties and Qualities

Wheeling

Depth class: Very deep
Drainage class: Well drained
Landscape position: Terraces
Parent material: Mixed, loamy, nonlocal alluvium of the Ohio River flood plains; Quaternary System
Surface texture: Loam
Slope: Gently sloping to steep

Nolin

Depth class: Very deep
Drainage class: Well drained
Landscape position: Flood plains below the Wheeling and Otwell soils
Parent material: Loamy, nonlocal alluvium derived from limestone, siltstone, and shale; Quaternary System
Surface texture: Silt loam
Slope: Nearly level and gently sloping

Otwell

Depth class: Very deep
Drainage class: Moderately well drained
Landscape position: Terraces
Parent material: Old, mixed, silty, local and nonlocal alluvium derived from sediment from upland soils formed in material weathered from limestone, siltstone, shale, and sandstone; Quaternary System
Surface texture: Silt loam
Slope: Gently sloping and moderately sloping

Minor Soils

- Ashton, Chavies, Lawrence, and Morehead soils on terraces
- Lakin soils on terraces in areas of eolian sand deposits
- Melvin and Newark soils on flood plains
- Woolper soils on toeslopes and low terraces

Use and Management

Major uses: Cropland, hayland, pasture, and as a site for farmsteads, rural homes, and small communities
Management concerns: Farming—flooding, a seasonal high water table, erosion, slope; residential uses—flooding, low strength, a seasonal high water table, slope, restricted or slow permeability
Management considerations: Farming—flood control, a drainage system, outlet ditches, cover crops with a moderately deep or deep root system, streambank vegetation; residential uses—site selection, addition of fill material, grading, proper design

2. Newark-Kinnick-Skidmore

Very deep, nearly level and gently sloping, somewhat poorly drained and well drained soils that have a silty or loamy subsoil; on flood plains

Setting

Landform: Stream valleys, in the western part of the county
Slope: 0 to 4 percent

Composition

Extent of map unit in the county: 3 percent
Composition of map unit:
Newark soils—23 percent
Kinnick soils—17 percent
Skidmore soils—15 percent
Minor soils—45 percent

Soil Properties and Qualities

Newark

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landscape position: Flood plains and depressional areas on flood plains
Parent material: Mixed alluvium derived from limestone, siltstone, shale, and loess; Quaternary System
Surface texture: Silt loam
Slope: Nearly level

Kinnick

Depth class: Very deep
Drainage class: Well drained
Landscape position: Flood plains
Parent material: Loamy, local alluvium derived from limestone, siltstone, and shale; Quaternary System
Surface texture: Silt loam
Slope: Nearly level and gently sloping

Skidmore

Depth class: Very deep
Drainage class: Well drained
Landscape position: Flood plains in narrow valleys and along feeder streams
Parent material: Mixed, local alluvium derived from sandstone, siltstone, and shale; Quaternary System
Surface texture: Gravelly silt loam
Slope: Nearly level and gently sloping

Minor Soils

- Elk, McGary, Morehead, Otwell, and Sees soils on terraces
- Boonesboro and Melvin soils on flood plains
- Covedale and Shelocta soils on toeslopes and fans
- Woolper soils on toeslopes and low terraces

Use and Management

Major uses: Cropland, hayland, and pasture
Management concerns: Flooding, a seasonal high water table, low available water capacity
Management considerations: Flood control, a drainage system, outlet ditches, cover crops with a moderately deep or deep root system, streambank vegetation

3. Skidmore-Shelocta-Haymond

Deep and very deep, nearly level to moderately steep, well drained soils that have a loamy subsoil; on flood plains, alluvial fans, and footslopes

Setting

Landform: Stream valleys of the Kinniconick Creek and its tributary streams (fig. 4), in the eastern part of the county
Slope: 0 to 20 percent

Composition

Extent of map unit in the county: 5 percent
Composition of map unit:
Skidmore soils—46 percent
Shelocta soils—20 percent
Haymond soils—16 percent
Minor soils—18 percent

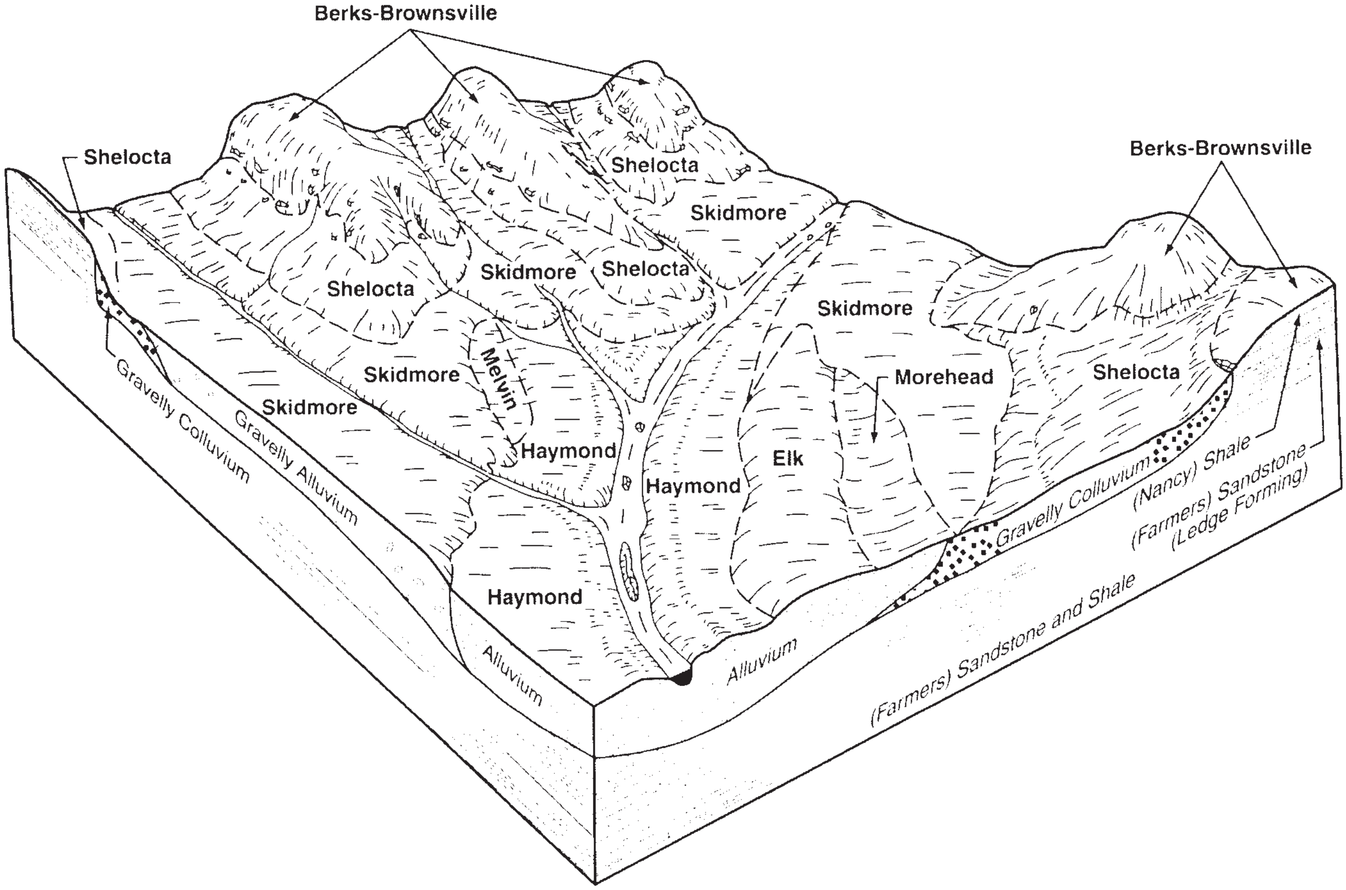

Figure 4.—Typical pattern of soils and parent material in the Skidmore-Shelocta-Haymond general soil map unit.

Soil Properties and Qualities

Skidmore

Depth class: Very deep
Drainage class: Well drained
Landscape position: Flood plains in the upper watershed of larger streams, narrow valleys, and feeder streams
Parent material: Mixed, local alluvium derived from sandstone, siltstone, and shale; Quaternary System
Surface texture: Gravelly silt loam
Slope: Nearly level and gently sloping

Shelocta

Depth class: Deep and very deep
Drainage class: Well drained
Landscape position: Footslopes and alluvial fans above the Skidmore and Haymond soils
Parent material: Mixed alluvium derived from shale, sandstone, and siltstone; Mississippian System
Surface texture: Silt loam and gravelly silt loam
Slope: Gently sloping to moderately steep

Haymond

Depth class: Very deep
Drainage class: Well drained
Landscape position: Flood plains in the larger stream valleys
Parent material: Silty, local alluvium derived from limestone, siltstone, shale, and loess; Quaternary System
Surface texture: Silt loam
Slope: Nearly level

Minor Soils

- Elk, McGary, Morehead, and Otwell soils on terraces
- Melvin and Newark soils on flood plains
- Covedale soils that are on footslopes and fans and formed in material weathered from black, fissile shale of the Devonian System

Use and Management

Major uses: Cropland, hayland, pasture, woodland, and scattered sites for farmsteads or rural homes

Management concerns: Farming—flooding, high content of coarse fragments, low available water capacity, erosion, slope; residential uses—flooding, low strength, slope

Management considerations: Farming—flood control, cover crops with a moderately deep or deep root system, site selection for cultivated crops, selection of plants that can tolerate brief periods of flooding, grassed waterways, streambank vegetation; residential uses—site selection, addition of fill material, grading, proper design

4. Fairmount-Faywood

Shallow and moderately deep, steep and very steep, well drained soils that have a clayey subsoil; on side slopes

Setting

Landform: Uplands, in the northwestern part of the county

Slope: 20 to 55 percent

Composition

Extent of map unit in the county: 3 percent

Composition of map unit:

Fairmount soils—46 percent
Faywood soils—29 percent
Minor soils—25 percent

Soil Properties and Qualities

Fairmount

Depth class: Shallow
Drainage class: Well drained
Landscape position: Side slopes
Parent material: Clayey residuum derived from limestone and shale of the Bull Fork Formation; Ordovician System
Surface texture: Very flaggy silty clay loam
Slope: Steep and very steep

Faywood

Depth class: Moderately deep
Drainage class: Well drained
Landscape position: Side slopes
Parent material: Clayey residuum derived from limestone and shale of the Bull Fork Formation; Ordovician System
Surface texture: Silty clay loam
Slope: Steep and very steep

Minor Soils

- Boonesboro, Kinnick, and Newark soils on flood plains
- Otwell soils on terraces of the wider valleys
- Woolper soils on toeslopes and low terraces

Use and Management

Major uses: Woodland and pasture (fig. 5)

Management concerns: Forestry—equipment limitation, seedling mortality, erosion, plant competition; farming—slope, depth to bedrock, rock outcrop, surface stones, low available water capacity, erosion

Management considerations: Forestry—tracked equipment, haul roads and access roads built on the contour, water bars, roads seeded to grass after harvest, seedlings planted during the wetter periods, plant selection; farming—restricted grazing or use as woodland, selection of plants that have a shallow or moderately deep root system and can tolerate droughtiness, a rotation grazing system

5. Shrouts-Beasley

Moderately deep and deep, gently sloping to steep, well drained soils that have a clayey subsoil; on ridgetops and side slopes

Setting

Landform: Uplands, in the western part of the county
Slope: 2 to 30 percent

Composition

Extent of map unit in the county: 13 percent

Composition of map unit:

Shrouts soils—40 percent
Beasley soils—33 percent
Minor soils—27 percent

Soil Properties and Qualities

Shrouts

Depth class: Moderately deep
Drainage class: Well drained
Landscape position: Ridgetops and side slopes
Parent material: Clayey residuum derived from calcareous shales interbedded with thin dolomite of the Upper and Lower Crab Orchard Formations; Silurian System
Surface texture: Silty clay loam
Slope: Gently sloping to steep

Beasley

Depth class: Deep
Drainage class: Well drained
Landscape position: Ridgetops and side slopes

Figure 5.—Pasture in an area of the Fairmount-Faywood general soil map unit. Limestone flagstones have been stacked on the soil surface.

Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation and olive, calcareous shales of the Lower and Upper Crab Orchard Formations of the Silurian System and brown dolomite and calcareous shale of the Preachersville Member of the Drakes Formation of the Ordovician System
Surface texture: Silt loam
Slope: Gently sloping to steep

Minor Soils

- Aaron, Caneyville, Covedale, Crider, Hagerstown, and Nicholson soils on ridgetops and side slopes
- Woolper soils on toeslopes and low terraces

Use and Management

Major uses: Cropland, hayland, pasture, and as a site for rural homes
Management concerns: Farming—slope, erosion, low available water capacity, depth to bedrock; residential uses—low strength, a moderate shrink-swell potential, depth to bedrock, slow permeability, clayey textures, slope
Management considerations: Farming—a rotation grazing system, a conservation tillage system, cover crops that have a moderately deep root system, plant selection, grassed waterways; residential uses—site selection, addition of fill material, grading, proper design, an oversized absorption field on sites for septic tank systems

6. Lawrence-Nicholson-McGary

Very deep, nearly level to moderately sloping, somewhat poorly drained and moderately well drained soils that have a silty or clayey subsoil; on stream terraces, ridgetops, and side slopes

Setting

Landform: Uplands and stream valleys, in the western part of the county
Slope: 0 to 12 percent

Composition

Extent of map unit in the county: 2 percent
Composition of map unit:
Lawrence soils—42 percent
Nicholson soils—22 percent
McGary soils—20 percent
Minor soils—16 percent

Soil Properties and Qualities

Lawrence

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landscape position: Broad flats, ridgetops, and stream terraces
Parent material: Silty material over calcareous shales and dolomite of the Upper Crab Orchard Formation of the Silurian System (on uplands) and silty alluvium of the Quaternary System (on terraces)
Surface texture: Silt loam
Slope: Nearly level

Nicholson

Depth class: Very deep
Drainage class: Moderately well drained
Landscape position: Ridgetops and side slopes
Parent material: Silty material underlain by clayey residuum derived from limestone, siltstone, and calcareous shale; Ordovician and Silurian Systems
Surface texture: Silt loam
Slope: Gently sloping and moderately sloping

McGary

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landscape position: Broad flats and depressional areas on ridgetops
Parent material: Silty and clayey alluvium of the Quaternary System and silty and clayey material over calcareous shales and dolomite of the Upper Crab Orchard Formation of the Silurian System
Surface texture: Silt loam
Slope: Nearly level

Minor Soils

- Aaron, Beasley, and Shrouts soils on ridgetops and side slopes
- Newark soils on flood plains

Use and Management

Major uses: Cropland, hayland, pasture, and as a site for residential structures
Management concerns: Farming—slope, erosion, a seasonal high water table, restricted rooting depth; residential uses—low strength, a seasonal high water table, a moderate shrink-swell potential, restricted or slow permeability
Management considerations: Farming—a conservation tillage system, forage management, selection of plants that have a moderately deep or deep root system and can tolerate wetness, grassed waterways; residential uses—site selection, fill material, proper design, an oversized absorption field on sites for septic tank systems

7. Hagerstown-Caneyville-Beasley

Very deep to moderately deep, gently sloping to very steep, well drained soils that have a clayey subsoil; on ridgetops and the upper side slopes

Setting

Landform: Uplands, in the northwestern part of the county
Slope: 2 to 45 percent

Composition

Extent of map unit in the county: 1 percent
Composition of map unit:
Hagerstown soils—30 percent
Caneyville soils—22 percent
Beasley soils—17 percent
Minor soils—31 percent

Soil Properties and Qualities

Hagerstown

Depth class: Very deep
Drainage class: Well drained
Landscape position: Ridgetops and the upper side slopes
Parent material: Clayey residuum derived from brown, coarse grained dolomite of the Bisher Formation; Silurian System
Surface texture: Silt loam
Slope: Gently sloping to very steep

Caneyville

Depth class: Moderately deep
Drainage class: Well drained
Landscape position: Ridgetops and upper side slopes
Parent material: Clayey residuum derived from coarse grained dolomite of the Bisher Formation; Silurian System
Surface texture: Silt loam
Slope: Moderately steep to very steep

Beasley

Depth class: Deep
Drainage class: Well drained
Landscape position: Ridgetops above the Caneyville soils
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation and olive, calcareous shales of the Lower and Upper Crab Orchard Formations; Silurian System
Surface texture: Silt loam
Slope: Gently sloping to steep

Minor Soils

- Aaron, Covedale, Crider, Nicholson, Shrouts, and Trappist soils on ridgetops

Use and Management

Major uses: Cropland, hayland, pasture, and, in small areas, woodland
Management concerns: Farming—slope, erosion, depth to bedrock, rock outcrop, stones at the soil surface, low available water capacity
Management considerations: Farming—a conservation tillage system, grassed waterways, cover crops with a moderately deep or deep root system, a rotation grazing system, careful selection of sites for cultivated crops

8. Covedale-Trappist

Very deep and moderately deep, gently sloping to very steep, well drained soils that have a clayey subsoil; on side slopes, footslopes, and ridgetops

Setting

Landform: Uplands and stream valleys (fig. 6), in the west-central part of the county
Slope: 2 to 55 percent

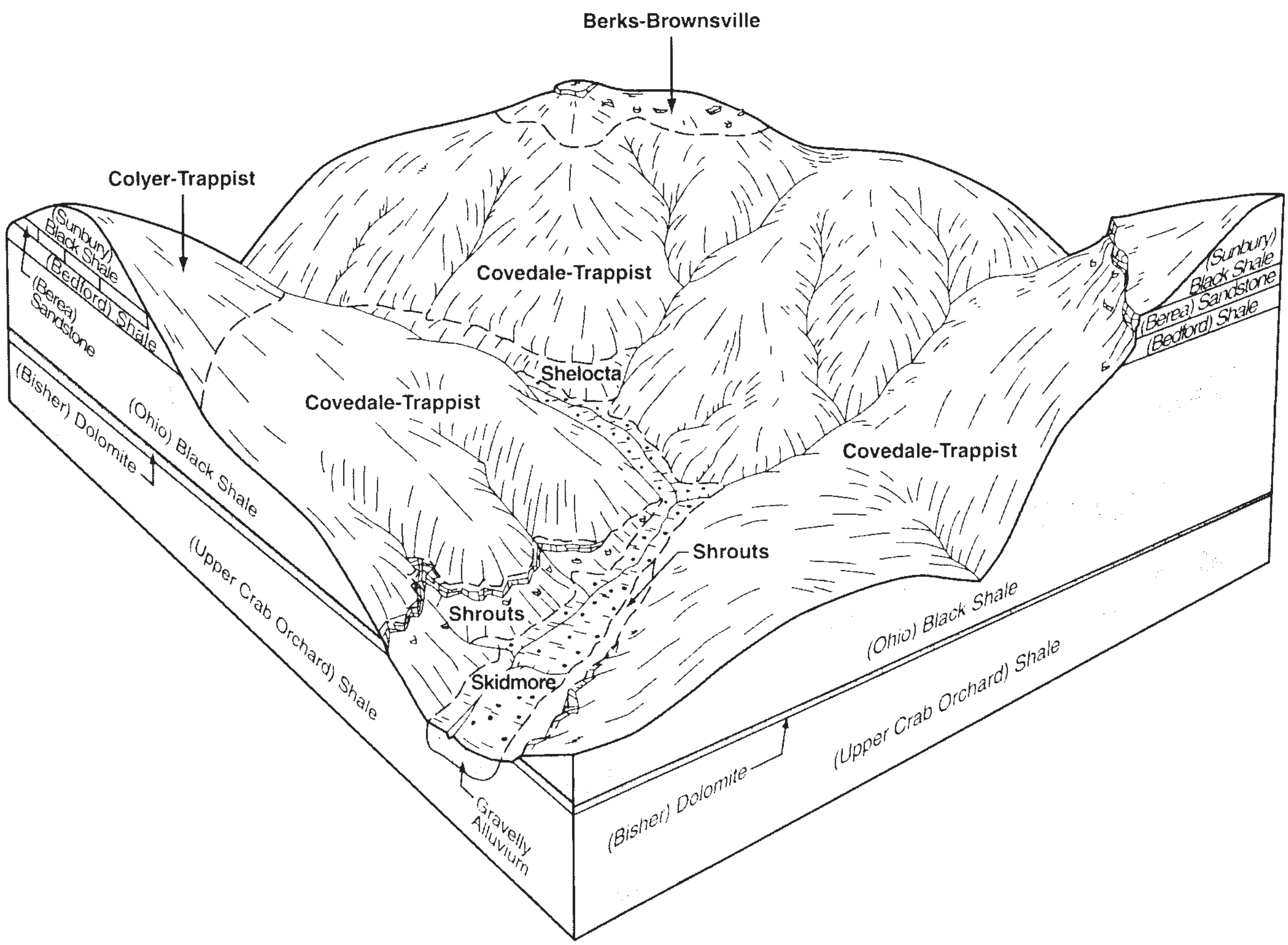

Figure 6.—Typical pattern of soils and parent material in the Covedale-Trappist general soil map unit.

Composition

Extent of map unit in the county: 10 percent
Composition of map unit:
Covedale soils—53 percent
Trappist soils—31 percent
Minor soils—16 percent

Soil Properties and Qualities

Covedale

Depth class: Very deep
Drainage class: Well drained
Landscape position: Side slopes, footslopes, toeslopes, and fans
Parent material: Silty colluvium or residuum derived from black, fissile shales of the Ohio Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Surface texture: Silt loam
Slope: Gently sloping to very steep

Trappist

Depth class: Moderately deep
Drainage class: Well drained
Landscape position: Ridgetops and side slopes
Parent material: Clayey residuum derived from black, fissile shales of the Ohio Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Surface texture: Silt loam
Slope: Gently sloping to very steep

Minor Soils

- Berks and Brownsville soils on the upper side slopes
- Colyer soils on points and peaks
- Shelocta and Shrouts soils on side slopes and footslopes
- Skidmore soils on narrow flood plains

Use and Management

Major uses: Woodland, pasture, and hayland
Management concerns: Forestry—erosion, an equipment limitation, plant competition; farming—slope, erosion, depth to bedrock, acidity
Management considerations: Forestry—tracked equipment, haul roads and access roads built on the contour, water bars, a cover of grasses on roads and in loading areas, control of undesirable vegetation, plant selection; farming—restrict cultivated crops to areas having slopes of less than 15 percent, a conservation tillage system, grassed waterways, cover crops, selection of plants with a moderately deep or deep root system, careful selection of sites for cultivated crops, a rotation grazing system

9. Blairton-Berks-Brownsville

Moderately deep to very deep, gently sloping to very steep, moderately well drained and well drained soils that have a loamy subsoil; on ridgetops and side slopes

Setting

Landform: Uplands (fig. 7), in the southwestern part of the county
Slope: 2 to 60 percent

Composition

Extent of map unit in the county: 4 percent
Composition of map unit:
Blairton soils—43 percent
Berks soils—18 percent
Brownsville soils—14 percent
Minor soils—25 percent

Soil Properties and Qualities

Blairton

Depth class: Moderately deep
Drainage class: Moderately well drained
Landscape position: Ridgetops
Parent material: Silty residuum derived from shale and sandstone of the Bedford Formation and sandstone, siltstone, and shale of the Nancy Member of the Borden Formation; Mississippian System
Surface texture: Silt loam
Slope: Gently sloping to steep

Berks

Depth class: Moderately deep
Drainage class: Well drained
Landscape position: Side slopes
Parent material: Loamy residuum derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation; Mississippian System
Surface texture: Channery silt loam
Slope: Very steep

Brownsville

Depth class: Deep and very deep
Drainage class: Well drained

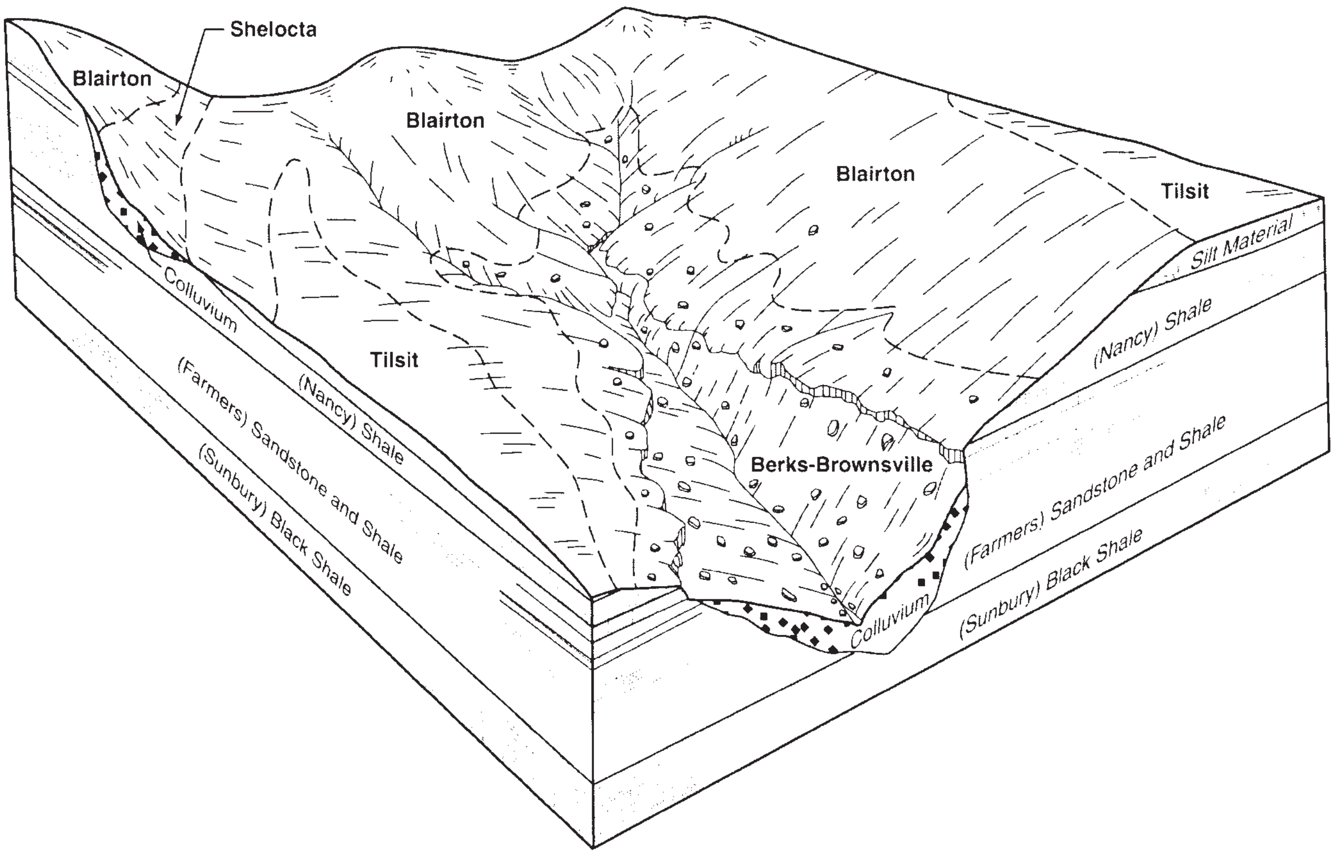

Figure 7.—Typical pattern of soils and parent material in the Blairton-Berks-Brownsville general soil map unit.

Landscape position: Side slopes
Parent material: Loamy colluvium derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation; Mississippian System
Surface texture: Very channery silt loam
Slope: Very steep

Minor Soils

- Tilsit soils on broad ridgetops
- Shelocta soils on side slopes

Use and Management

Major uses: Cropland, hayland, and pasture
Management concerns: Farming—slope, depth to bedrock, low available water capacity, stones common at the soil surface, rock outcrop, erosion
Management considerations: Farming—careful selection of sites for cultivated crops, grassed waterways, a conservation tillage system, cover crops having a moderately deep rooting system, a rotation grazing system, plant selection

10. Berks-Brownsville-Blairton

Moderately deep to very deep, gently sloping to very steep, well drained and moderately well drained soils that have a loamy subsoil; on side slopes and narrow ridgetops

Setting

Landform: Uplands, in the central part of the county
Slope: 2 to 65 percent

Composition

Extent of map unit in the county: 23 percent (fig. 8)
Composition of map unit:
Berks soils—33 percent
Brownsville soils—26 percent
Blairton soils—15 percent
Minor soils—26 percent

Soil Properties and Qualities

Berks

Depth class: Moderately deep
Drainage class: Well drained

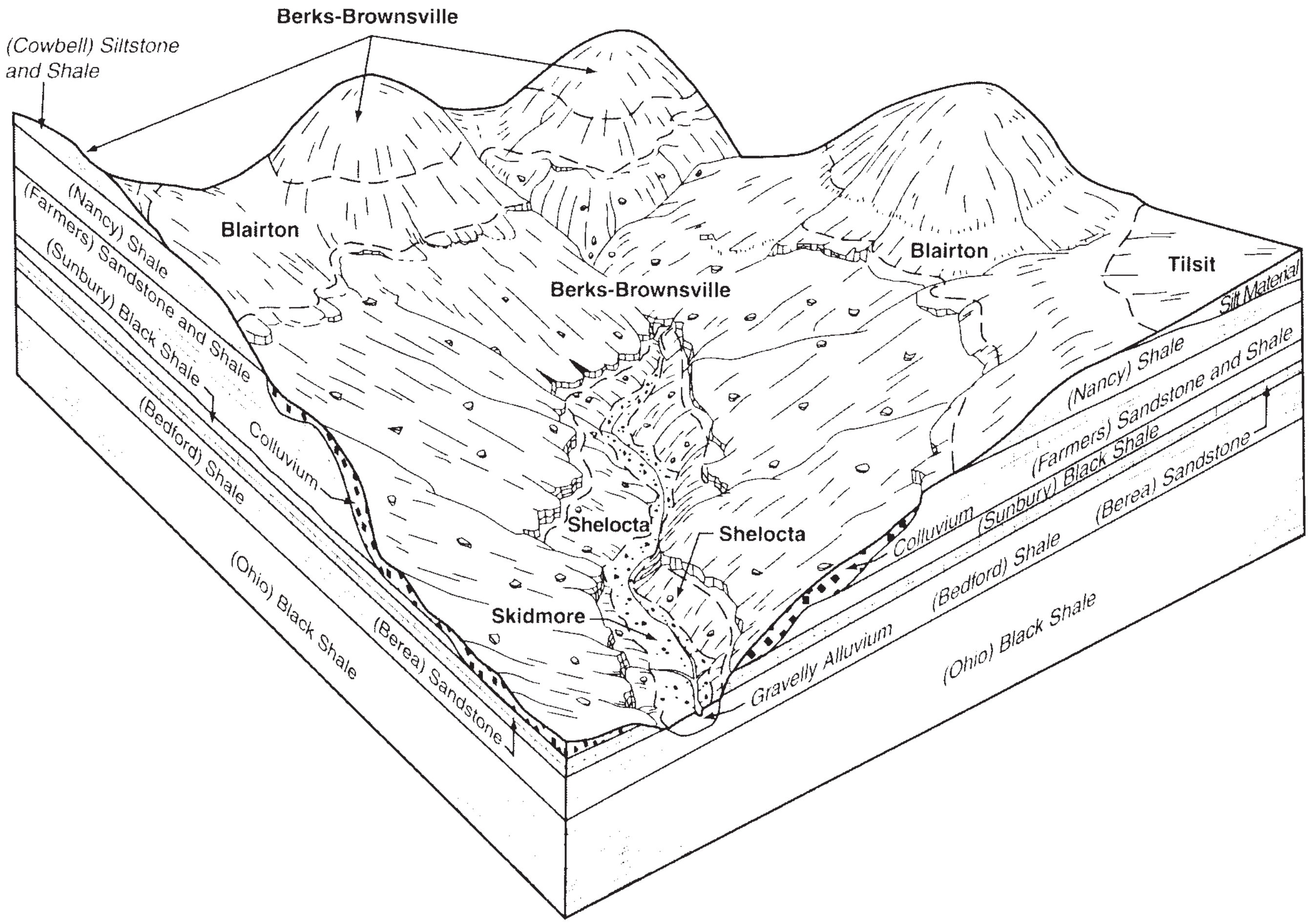

Figure 8.—Typical pattern of soils and parent material in the Berks-Brownsville-Blairton general soil map unit.

Landscape position: Side slopes and narrow ridgetops
Parent material: Loamy residuum derived from the sandstone, siltstone, and shale from members of the Borden Formation; Mississippian System
Surface texture: Channery silt loam
Slope: Very steep

Brownsville

Depth class: Deep and very deep
Drainage class: Well drained
Landscape position: Side slopes
Parent material: Loamy colluvium from the sandstone, siltstone, and shale from members of the Borden Formation; Mississippian System
Surface texture: Very channery silt loam
Slope: Very steep

Blairton

Depth class: Moderately deep
Drainage class: Moderately well drained
Landscape position: Ridgetops
Parent material: Silty residuum derived from sandstone, siltstone, and shale of the Nancy Member of the Borden Formation; Mississippian System
Surface texture: Silt loam
Slope: Gently sloping to steep

Minor Soils

- Colyer and Trappist soils that are on the lower side slopes along the Kinniconick Creek and have small, exposed areas of black, fissile shales of the Sunbury Formation of the Mississippian System
- Shelocta soils on side slopes; footslopes; and sloping, narrow flood plains
- Tilsit soils on the broader ridgetops
- Skidmore soils on narrow flood plains

Use and Management

Major uses: Woodland and pasture
Management concerns: Forestry—erosion, an equipment limitation, plant competition;

farming—slope, erosion, stones common at the soil surface, rock outcrop, depth to bedrock, low available water capacity

Management considerations: Forestry—tracked equipment, haul roads and access roads built on the contour, water bars, culverts, a cover of grasses on roads and in loading areas, seedlings planted during the wet season; farming—selection of low maintenance plants that have a moderately deep or deep root system and can tolerate droughtiness, a restricted grazing system

11. Berks-Brownsville-Shelocta

Moderately deep to very deep, moderately sloping to very steep, well drained soils that have a loamy subsoil; on side slopes, ridgetops, and toeslopes

Setting

Landform: Uplands (fig. 9), in the southern and eastern parts of the county

Slope: 6 to 65 percent

Composition

Extent of map unit in the county: 26 percent

Composition of map unit:
- Berks soils—34 percent
- Brownsville soils—34 percent
- Shelocta soils—13 percent
- Minor soils—19 percent

Soil Properties and Qualities

Berks

Depth class: Moderately deep

Drainage class: Well drained

Landscape position: Narrow ridgetops and side slopes and along the Kinniconick Creek on the lower side slopes

Parent material: Loamy residuum derived from sandstone, siltstone, and shale of the Farmers and Cowbell Members of the Borden Formation; Mississippian System

Surface texture: Channery silt loam

Slope: Very steep

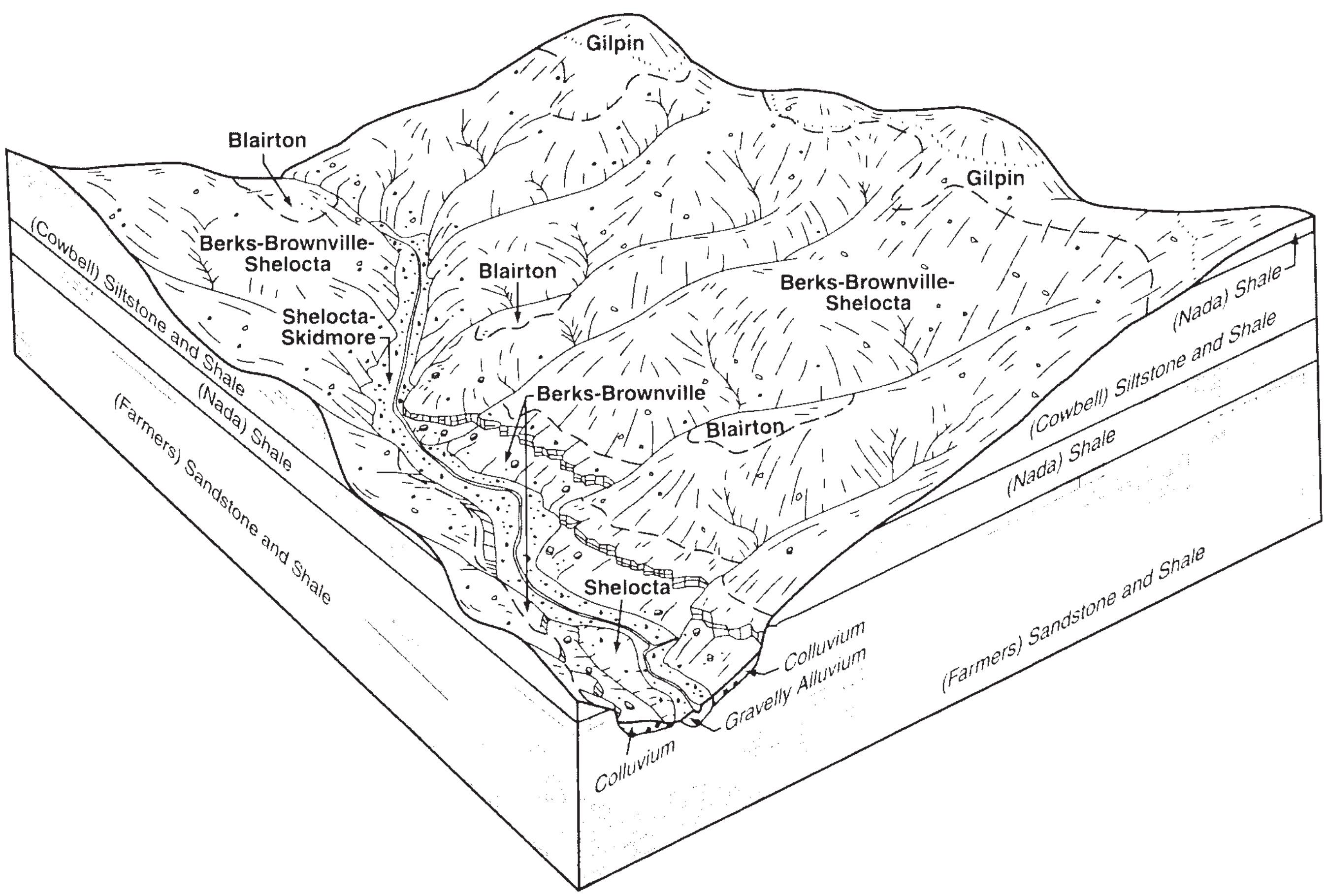

Figure 9.—Typical pattern of soils and parent material in the Berks-Brownsville-Shelocta general soil map unit.

Brownsville

Depth class: Deep and very deep
Drainage class: Well drained
Landscape position: Side slopes where they are mixed with the Berks and Shelocta soils and on the lower side slopes along the Kinniconick Creek with sandstone rock outcrop
Parent material: Loamy colluvium derived from sandstone, siltstone, and shale of the Farmers and Cowbell Members of the Borden Formation; Mississippian System
Surface texture: Very channery silt loam
Slope: Very steep

Shelocta

Depth class: Deep and very deep
Drainage class: Well drained
Landscape position: Side slopes and toeslopes
Parent material: Mixed colluvium from the sandstone, siltstone, and shale of the Borden Formation; Mississippian System
Surface texture: Silt loam and gravelly silt loam
Slope: Very steep to moderately sloping

Minor Soils

• Blairton and Tilsit soils on ridgetops on the Nancy Shale Member of the Borden Formation
• Gilpin soils on ridgetops and the upper side slopes at the contact with the Nada Shale Member of the Borden Formation
• Skidmore soils in narrow drainageways

Use and Management

Major uses: Woodland
Management concerns: Forestry—an equipment limitation, erosion, plant competition
Management considerations: Forestry—tracked equipment, haul roads and access roads built on the contour, water bars, culverts, roads seeded to grass after harvest, control of undesirable vegetation, seedlings planted during the wet season

12. Gilpin-Caneyville

Moderately deep, moderately sloping to very steep, well drained soils that have a loamy or clayey subsoil; on ridgetops and the upper side slopes

Setting

Landform: Uplands, along the eastern and southern boundaries of the county
Slope: 6 to 45 percent

Composition

Extent of map unit in the county: 3 percent
Composition of map unit:
Gilpin soils—75 percent
Caneyville soils—22 percent
Minor soils—3 percent

Soil Properties and Qualities

Gilpin

Depth class: Moderately deep
Drainage class: Well drained
Landscape position: Ridgetops and the upper side slopes
Parent material: Loamy residuum derived from the shale, sandstone, and siltstone of the Cowbell, Nada, and Carter Caves Sandstone Members of the Borden Formation of the Mississippian System and from the sandstone, siltstone, and shale of the Breathitt and Lee Formations of the Pennsylvanian System
Surface texture: Silt loam
Slope: Moderately sloping to very steep

Caneyville

Depth class: Moderately deep
Drainage class: Well drained
Landscape position: Ridgetops and shoulder slopes, which have limestone ledges and rock outcrop
Parent material: Clayey residuum derived from limestone and calcareous shale of the Newman Limestone Formation; Mississippian System
Surface texture: Silt loam
Slope: Moderately steep and steep

Minor Soils

• Berks and Brownsville soils on side slopes below the Caneyville and Gilpin soils
• Blairton soils on ridgetops and the upper side slopes below the Gilpin and Caneyville soils

Use and Management

Major uses: Pasture and woodland
Management concerns: Forestry—an equipment limitation, erosion, seedling mortality, plant competition; farming—slope, low available water capacity, depth to bedrock, erosion, rock outcrop, boulders and stones common at the soil surface
Management considerations: Forestry—tracked equipment, access roads and haul roads built on the contour, water bars, culverts, grass plantings, planting seedlings during the wet season, control of undesirable vegetation; farming—selection of

plants that have a moderately deep root system and can tolerate droughtiness, a rotation grazing system

Broad Land Use Considerations

The soils in Lewis County vary in their suitability for major land uses. About 20 percent of the acreage is used for cultivated crops or hay, with burley tobacco, corn, soybeans, and wheat being the dominant cultivated crops. Most of the acreage in general soil map units 1, 6, and 7 is cultivated, while most of the acreage in general soil map units 2 and 3 is used for cultivated crops or hay. The acreage in general soil map unit 5 is dominantly used as pasture, but a large percentage of it is used for cultivated crops or hay. Flooding and a seasonal high water table are the main limitations in general soil map units 1, 2, and 3. A seasonal high water table and a restricted rooting depth are the main limitations in general soil map unit 6. Slope, depth to bedrock, rock outcrop, and erosion are the main limitations in general soil map unit 7. Slope, erosion, and depth to bedrock are the main limitations in general soil map unit 5.

About 25 percent of the acreage in the county is used as pasture or grazed woodland. Most of this acreage is in general soil map units 4, 5, 8, 9, and 12. Some is on the broader ridgetops and the lower side slopes and in narrow valleys of general soil map unit 10 and on the lower side slopes and in narrow valleys of general soil map unit 11. A shallow or moderately deep rooting depth, low available water capacity, rock outcrop, steep or very steep slopes, and common flagstones at the soil surface are the main limitations in general soil map unit 4. Steep or very steep slopes, depth to bedrock, a hazard of erosion, and low available water capacity are the main limitations in general soil map units 5 and 12. Very steep slopes, depth to bedrock, low available water capacity, common stones and boulders at the soil surface, and rock outcrop are the main limitations in general soil map units 8, 10, and 11. A seasonal high water table, steep or very steep slopes, depth to bedrock, and rock outcrop are the main limitations in general soil map unit 9.

Woodland is the dominant land use in Lewis County, with about 55 percent of the acreage used for timber production. All of the general soil map units in the county are suited to woodland, but general soil map units 10 and 11 are used almost exclusively for timber production. Because of rock outcrop or very steep slopes, the equipment limitation is moderate or severe on most of the soils. It can be overcome by using special equipment. A moderately deep root system and the low available water capacity of some soils may result in a high rate of seedling mortality. Replanting during the wetter season may help to reduce the seedling mortality rate.

A few areas of the county have been developed for urban uses. In general, gently sloping or sloping, deep or very deep, well drained or moderately well drained soils are better suited to building site development. Beasley, Hagerstown, Nicholson, Otwell, Shelocta, and Wheeling soils in general soil map units 1, 3, 5, 6, and 7 are examples. Management concerns for some of these soils and those in general soil map units 4, 9, and 12 may include depth to bedrock, slope, a shrink-swell potential, low strength, slow or restricted permeability, and a seasonal high water table. The soils in general soil map units 8, 10, and 11 are generally not suited to urban uses because of very steep slopes, rock outcrop, common stones and boulders at the soil surface, and depth to bedrock. The soils that are on flood plains and low terraces and are subject to flooding, such as those in general soil map units 1, 2, and 3, are generally unsuitable as sites for buildings.

In most areas of the county, individual septic tank absorption systems are used. The Hagerstown and Wheeling soils in general soil map units 1 and 7 are suited to septic tank absorption fields. Soils on flood plains or low terraces in general soil map units 1, 2, and 3 that are subject to flooding are generally unsuited to septic tank absorption fields. Restricted or slow permeability, a restricted depth to bedrock, slopes of more than 8 percent, and a seasonal high water table are the main limitations for most soils in general soil map units 4 through 12. Proper design or an alternative waste disposal system can help to overcome most of these limitations.

The limitations affecting the suitability of the general soil map units for recreational uses range from severe to slight, depending on the intensity of the expected use. Some soils in general soil map units 1, 2, 3, and 6 are unsuited to many of these uses because of flooding or a seasonal high water table. All of the general soil map units are suitable for some recreational uses, such as paths and trails for hiking or horseback riding. Small areas that are suitable for intense recreational uses generally are available in the general soil map units that otherwise have severe limitations.

The suitability for wildlife habitat is generally good to excellent throughout the county. All of the general soil map units have major soils that are well suited to habitat for openland or woodland wildlife. Scattered areas in general soil map units 1, 2, and 3 are suited to wetland wildlife habitat.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Beasley silt loam, 2 to 6 percent slopes, is a phase of the Beasley series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Berks-Brownsville complex, 30 to 55 percent slopes, very rocky, eroded, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Pits, quarries, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Table of Contents") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

AaB—Aaron silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Moderately broad or broad ridgetops
Size of areas: 5 to 30 acres
Major uses: Cropland and hayland

Composition

Aaron soil and similar components: 75 to 85 percent
Contrasting components: 15 to 25 percent

Minor Components

Similar components:
• Soils that are less than 40 inches deep to bedrock
• Soils that are not so well drained as the Aaron soil

Contrasting components:
• The well drained Beasley soils
• The very deep, somewhat poorly drained McGary soils
• The very deep Nicholson soils that have a fine-silty control section and a fragipan
• The very deep, somewhat poorly drained Lawrence soils that have a fine-silty control section and a fragipan

Typical Profile

Surface layer:
0 to 8 inches; brown silt loam

Subsurface layer:
8 to 14 inches; brown and yellowish brown silt loam

Subsoil:
14 to 45 inches; yellowish brown silty clay loam and clay

Substratum:
45 to 53 inches; strong brown and grayish green clay

Bedrock:
53 inches: hard, brown dolomitic limestone

Soil Properties and Qualities

Depth class: Deep
Depth to bedrock: 40 to 60 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: At a depth of 18 to 36 inches
Available water capacity: Moderate
Permeability: Slow
Parent material: Clayey residuum derived from calcareous shale and dolomite of the Upper Crab Orchard Formation; Silurian System
Runoff: Slow or medium
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Planting and harvesting may need to be delayed because of the seasonal high water table.
• The crops selected for planting should be those that can tolerate wetness.
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate wetness for short periods.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.

• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White oak, hickory, white ash, black locust, sugar maple
Some preferred trees for planting: White oak, white ash, sweetgum, sugar maple, pin oak
Management considerations:
• The equipment limitation and plant competition are the main management concerns.
• Equipment should be operated only when the soil is dry.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can tolerate wetness and withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability in the subsoil on sites for campgrounds and playgrounds.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling of the subsoil.
• If buildings with basements are constructed, care should be taken to select sites where the depth to bedrock is adequate.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the slow permeability of the subsoil.
• Constructing absorption fields in raised areas or in a mound of suitable fill material helps to overcome the wetness.

Interpretive Groups

Land capability classification: IIe

AsB—Ashton silt loam, 2 to 6 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Low terraces on the Ohio River flood plain
Size of areas: 5 to 70 acres
Major uses: Cropland, hayland, and pasture

Composition

Ashton soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils having a surface layer that is not so dark as that of the Ashton soil
• Soils that have less clay in the subsoil than the Ashton soil
• Soils having a surface layer that meets the base saturation and color requirements for a mollic epipedon

Contrasting components:
• The moderately well drained Otwell soils that have a fragipan
• Small areas of the somewhat poorly drained Newark soils and the well drained Nolin soils that are in the lower landscape positions and subject to occasional periods of flooding
• The fine-loamy Wheeling soils

Typical Profile

Surface layer:
0 to 10 inches; dark brown silt loam

Subsoil:
10 to 62 inches; brown silt loam, silty clay loam, and loam

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty, nonlocal alluvium of the Quaternary System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent uplands and terraces.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.
• Building fences along streams to restrict livestock access helps to control streambank erosion.

Woodland

Suitability: Well suited
Some common trees: American sycamore, white ash, white oak, yellow-poplar, sweetgum
Some preferred trees for planting: Eastern white pine, yellow-poplar, black walnut, sweetgum, cherrybark oak
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Well suited
Management considerations:
• The included soils that are in the lower landscape positions and subject to flooding are unsuited to campgrounds and playgrounds and should be restricted to other uses.
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Generally well suited
Management considerations:
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.
• The included contrasting soils in the lower landscape positions are subject to flooding and therefore are unsuited to building site development.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Increasing the size of absorption fields helps to overcome the moderate permeability of the subsoil.
• Constructing absorption fields in a mound of suitable fill material helps to prevent inundation during periods

of flooding in areas of the included contrasting soils in the lower landscape positions.

Interpretive Groups

Land capability classification: IIe

BaB—Beasley silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 50 acres
Major uses: Cropland, hayland, pasture, and urban land

Composition

Beasley soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are less than 40 inches deep to bedrock
• Soils that are very deep to bedrock
• Soils that have slopes of less than 2 percent or more than 6 percent

Contrasting components:
• The very deep Nicholson soils that have a fragipan and a fine-silty control section
• The very deep, somewhat poorly drained McGary soils
• The moderately well drained Aaron soils

Typical Profile

Surface layer:
0 to 8 inches; yellowish brown silt loam

Subsoil:
8 to 33 inches; yellowish brown silty clay and clay

Substratum:
33 to 42 inches; yellowish brown and light olive brown clay

Bedrock:
42 to 53 inches; soft, greenish gray and light olive brown, calcareous shales mixed with or over hard, brown, coarse grained dolomite

Soil Properties and Qualities

Depth class: Deep
Depth to bedrock: 40 to 60 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderately slow
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation and olive calcareous shales of the Upper and Lower Crab Orchard Formations of the Silurian System and brown dolomite and calcareous shale of the Preachersville Member of the Drakes Formation of the Ordovician System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White oak, white ash, chinkapin oak, eastern redcedar, hackberry, black locust
Some preferred trees for planting: White oak, white ash, hickory

Management considerations:
• The equipment limitation and plant competition are the main management concerns.
• The high content of clay in the upper 10 inches of the solum restricts the use of equipment to periods when the soil is dry.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Suited
Management considerations:
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling of the subsoil.
• If buildings with basements are constructed, care should be taken to select sites where the depth to bedrock is adequate.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderately slow permeability of the subsoil.

Interpretive Groups

Land capability classification: IIe

BeC2—Beasley silt loam, 6 to 12 percent slopes, rocky, eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to 150 acres
Major uses: Cropland, hayland, and pasture

Composition

Beasley soil and similar components: 75 to 95 percent
Contrasting components: 5 to 25 percent

Minor Components

Similar components:
• Soils that are less than 40 inches or more than 60 inches deep to bedrock
• Soils that have slopes of less than 6 percent or more than 12 percent
• Soils that are not eroded or those that are only slightly eroded or more severely eroded than the Beasley soil

Contrasting components:
• The very deep Nicholson soils that have a fragipan and a fine-silty control section
• The very deep, somewhat poorly drained McGary soils
• The moderately deep Shrouts soils

Typical Profile

Surface layer:
0 to 5 inches; yellowish brown silt loam

Subsoil:
5 to 30 inches; yellowish brown silty clay and clay

Substratum:
30 to 42 inches; yellowish brown and light olive brown clay

Bedrock:
42 to 53 inches; soft, greenish gray and light olive brown, calcareous shales mixed with or over hard, brown, coarse grained dolomite

Soil Properties and Qualities

Depth class: Deep
Depth to bedrock: 40 to 60 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate

Permeability: Moderately slow
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation and olive, calcareous shale of the Lower and Upper Crab Orchard Formations of the Silurian System and brown dolomite and calcareous shale of the Preachersville Member of the Drakes Formation of the Ordovician System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White oak, white ash, chinkapin oak, eastern redcedar, hackberry, black locust
Some preferred trees for planting: White oak, white ash, hickory
Management considerations:
• The equipment limitation and plant competition are the main management concerns.
• The high content of clay in the upper 10 inches of the solum restricts the use of equipment to periods when the soil is dry.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
• Playgrounds should be restricted to areas of similar included soils having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Suited
Management considerations:
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling of the subsoil.
• If buildings with basements are constructed, care should be taken to select sites where the depth to bedrock is adequate.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.
• Land shaping helps to overcome the slope.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the slow permeability of the subsoil.

Interpretive Groups

Land capability classification: IIIe

BhE2—Beasley-Shrouts complex, 12 to 30 percent slopes, very rocky, eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to several hundred acres
Major uses: Pasture and woodland

Composition

Beasley soil and similar components: 35 to 45 percent
Shrouts soil and similar components: 30 to 40 percent
Rock outcrop: 1 to 5 percent
Contrasting components: 10 to 34 percent

Minor Components

Similar components:
• Soils that are similar to the Beasley soil but are less than 40 inches or more than 60 inches deep to bedrock
• Soils that are less sloping or more sloping than the Beasley soil
• Soils that are not so eroded or are more severely eroded than the Beasley soil
• Soils having redder colors in the solum than those of the Shrouts soil
• Soils that are similar to the Shrouts soil but are less than 20 inches or more than 40 inches deep to bedrock
• Soils that are more severely eroded than the Shrouts soil

Contrasting components:
• Boonesboro, Nolin, and Woolper soils

Typical Profile

Beasley

Surface layer:
0 to 5 inches; yellowish brown silt loam

Subsoil:
5 to 30 inches; yellowish brown silty clay and clay

Substratum:
30 to 42 inches; yellowish brown and light olive brown clay

Bedrock:
42 to 53 inches; soft, greenish gray and light olive brown, calcareous shales mixed with or overlying hard, brown, coarse grained dolomite

Shrouts

Surface layer:
0 to 3 inches; dark grayish brown silty clay loam

Subsoil:
3 to 20 inches; light olive brown and gray silty clay and clay

Substratum:
20 to 30 inches; light olive gray silty clay

Bedrock:
30 to 40 inches; light olive gray, soft shales

Soil Properties and Qualities

Beasley

Depth class: Deep
Depth to bedrock: 40 to 60 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Kind of rock fragments at the surface: Rock outcrop and fragments of dolomitic limestone
Available water capacity: Moderate
Permeability: Moderately slow
Parent material: Clayey residuum derived from olive, calcareous shales and brown dolomite of the Lower Crab Orchard Formation of the Silurian System and brown dolomite and calcareous shale of the Preachersville Member of the Drakes Formation of the Ordovician System
Runoff: Rapid
Tilth: Fair
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Shrouts

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Kind of rock fragments at the surface: Rock outcrop and fragments of dolomitic limestone
Available water capacity: Low
Permeability: Very slow
Parent material: Clayey residuum derived from olive, calcareous shale interbedded with thin dolomite of the Upper Crab Orchard Formation; Silurian System

Runoff: Rapid
Tilth: Fair
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• These soils are generally unsuited to cropland because of the slope; the depth to bedrock; the ledges of exposed dolomite; droughtiness; the numerous fragments of chert, dolomite, and shale at the soil surface; and the very severe hazard of erosion.

Hayland and Pasture

Suitability: Hayland—poorly suited; pasture—suited
Management considerations:
• These soils are poorly suited to hayland because the slope and the rock outcrop limit the use of mowing and renovation equipment.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, have a moderate or deep root system, and can withstand droughtiness.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Suited
Some common trees: Black locust, black oak, chinkapin oak, eastern redcedar, hickory, white oak
Some preferred trees for planting: White ash, white oak, hickory
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Because of the limited rooting depth, windthrow of some pine species is an additional hazard in areas of the Shrouts soil.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• The high content of clay in the upper 10 inches of the Shrouts soil restricts the use of equipment to periods when the soil is dry.
• Because the Shrouts soil is only moderately deep and has a low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and moderate foot traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
• Recreational development should be restricted to paths and trails.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding fill material to the basin and berm during construction of ponds for water or fish management helps to increase the water-holding capacity and overcome the limited depth to bedrock.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Land shaping and grading help to overcome the slope.
• Properly designing foundations helps to overcome the depth to bedrock and prevent the structural damage caused by shrinking and swelling.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Beasley—poorly suited; Shrouts—unsuited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the slow permeability of the subsoil and the depth to bedrock.
• Installing septic tank absorption fields on the contour or land grading helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: VIe

BnF2—Berks-Brownsville complex, 30 to 55 percent slopes, very rocky, eroded

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to several hundred acres
Major uses: Woodland

Composition

Berks soil and similar components: 35 to 45 percent
Brownsville soil and similar components: 25 to 35 percent
Rock outcrop: 5 to 9 percent
Contrasting soils: 11 to 35 percent

Minor Components

Similar components:
• Soils that are less than 20 inches deep to bedrock
• Soils that have a lower content of rock fragments in the subsoil than the Berks soil or the Brownsville soil
• Soils that have more silt in the control section than the Berks soil
• Soils that are less sloping than the Berks soil
• Soils that have higher pH throughout than is defined as the range for the Brownsville soil
• Soils that have an argillic horizon

Contrasting components:
• The moderately deep, moderately well drained Blairton soils
• Skidmore soils on flood plains
• The deep, fine-loamy Shelocta soils

Typical Profile

Berks

Surface layer:
0 to 3 inches; brown channery silt loam

Subsoil:
3 to 25 inches; brown and yellowish brown channery, very channery, and extremely channery loam

Bedrock:
25 inches; hard, fine grained sandstone

Brownsville

Surface layer:
0 to 4 inches; brown very channery silt loam

Subsoil:
4 to 43 inches; yellowish brown channery and very channery silt loam and very channery loam

Substratum:
43 to 62 inches; yellowish brown extremely channery loam

Bedrock:
62 inches; hard, fine grained sandstone

Soil Properties and Qualities

Berks

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 10 percent
Available water capacity: Very low
Permeability: Moderate or moderately rapid
Parent material: Loamy residuum derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation; Mississippian System
Runoff: Very rapid
Shrink-swell potential: Low
Hazard of erosion: Severe

Brownsville

Depth class: Very deep or deep
Depth to bedrock: 40 to 72 inches
Organic matter content: Moderately low or moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 10 percent
Available water capacity: Moderate

Permeability: Moderate or moderately rapid
Parent material: Loamy colluvium derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation; Mississippian System
Runoff: Very rapid
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• These soils are unsuited to cropland because of the depth to bedrock, the high content of rock fragments, the rock outcrop, droughtiness, the slope, and the very severe hazard of erosion.

Hayland and Pasture

Suitability: Hayland—unsuited; pasture—poorly suited
Management considerations:
• These soils are unsuited to hayland and poorly suited to pasture because of the depth to bedrock, the high content of rock fragments, the droughtiness, and the very severe hazard of erosion.
• The slope and the rock outcrop limit the use of farm machinery.

Woodland

Suitability: Suited
Some common trees: Cool slopes—northern red oak, black oak, hickory, red maple, white oak, American beech, eastern hemlock; warm slopes—black oak, Virginia pine, red maple, hickory, chestnut oak
Some preferred trees for planting: Cool slopes—eastern white pine, shortleaf pine, white oak, white ash, yellow-poplar; warm slopes—eastern white pine, Virginia pine, white oak, hickory
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• The rock outcrop and the steep and very steep slopes can restrict the use of wheeled and tracked equipment.
• A cable yarding system generally is safer than other logging methods and causes less soil disturbance.
• Because the Berks soil is only moderately deep and has a very low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Unsuited
Management considerations:
• These soils are unsuited to most recreational development because of the slope, the depth to bedrock, the high content of rock fragments, the rock outcrop, and the very severe erosion hazard.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Unsuited
Management considerations:
• These soils are unsuited to building site development because of the depth to bedrock, the high content of rock fragments, and the slope.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• These soils are unsuited to septic tank absorption fields because of the depth to bedrock, the high content of rock fragments, and the slope.

Interpretive Groups

Land capability classification: VIIe

BoF2—Berks-Brownsville-Shelocta complex, 30 to 65 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to several hundred acres
Major uses: Woodland

Composition

Berks soil and similar components: 30 to 40 percent
Brownsville soil and similar components: 30 to 40 percent
Shelocta soil and similar components: 15 to 25 percent
Contrasting components: 10 to 15 percent

Minor Components

Similar components:
- Soils that have more silt in the control section than the Berks soil or more clay in the subsoil than the Shelocta soil
- Soils that are less than 20 inches deep to bedrock
- Soils that have a lower content of rock fragments in the subsoil than the Berks soil or the Brownsville soil
- Soils that are less sloping than the Berks soil
- Soils that have a higher pH value throughout than the Berks soil or the Brownsville soil
- Soils that have an argillic horizon
- Soils that have a darker surface layer than that of the Shelocta soil

Contrasting components:
- The moderately deep Gilpin soils

Typical Profile

Berks

Surface layer:
0 to 3 inches; brown channery silt loam

Subsoil:
3 to 25 inches; brown and yellowish brown channery, very channery, and extremely channery loam

Bedrock:
25 inches; hard, fine grained sandstone

Brownsville

Surface layer:
0 to 4 inches; brown very channery silt loam

Subsoil:
4 to 43 inches; yellowish brown channery and very channery silt loam and very channery loam

Substratum:
43 to 62 inches; yellowish brown extremely channery loam

Bedrock:
62 inches; hard, fine grained sandstone

Shelocta

Surface layer:
0 to 4 inches; brown silt loam

Subsurface layer:
4 to 8 inches; yellowish brown silt loam

Subsoil:
8 to 23 inches; yellowish brown silt loam and gravelly silt loam
23 to 50 inches; strong brown loam and very gravelly loam

Bedrock:
50 inches; soft, layered siltstone over sandstone

Soil Properties and Qualities

Berks

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Very low
Permeability: Moderate or moderately rapid
Parent material: Silty or loamy residuum derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation; Mississippian System
Runoff: Very rapid
Shrink-swell potential: Low
Hazard of erosion: Severe

Brownsville

Depth class: Very deep or deep
Depth to bedrock: 40 to 72 inches
Organic matter content: Moderately low or moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderate or moderately rapid
Parent material: Loamy colluvium derived from sandstone, siltstone, and shale of the Borden

Formation and sandstone of the Berea Formation; Mississippian System
Runoff: Very rapid
Tilth: Poor
Shrink-swell potential: Low
Hazard of erosion: Severe

Shelocta

Depth class: Deep and very deep
Depth to bedrock: More than 40 inches
Organic matter content: Low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderate
Parent material: Loamy colluvium derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation; Mississippian System
Runoff: Very rapid
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• These soils are unsuited to cropland because of the slope, the depth to bedrock, the high content of rock fragments, droughtiness, and the very severe hazard of erosion.

Hayland and Pasture

Suitability: Unsuited
Management considerations:
• These soils are unsuited to hayland and pasture because of the slope, the depth to bedrock, the high content of rock fragments, the droughtiness, and the very severe hazard of erosion.

Woodland

Suitability: Suited
Some common trees: Cool slopes—black oak, northern red oak, hickory, red maple, scarlet oak, yellow-poplar, American beech; warm slopes—Virginia pine, chestnut oak, hickory, white oak, black gum, red maple
Some preferred trees for planting: Cool slopes—eastern white pine, northern red oak, shortleaf pine, white ash, white oak, yellow-poplar; warm slopes—eastern white pine, white ash, black oak, white oak, hickory
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Because the Berks soil is only moderately deep and has a very low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Seedling mortality is a more limiting factor on warm slopes than on cool slopes.
• Weeds and undesirable grasses and shrubs that compete with the trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Unsuited
Management considerations:
• These soils are unsuited to most recreational development because of the slope, the depth to bedrock, the high content of rock fragments, droughtiness, and very severe hazard of erosion.
• Recreational development should be restricted to paths and trails.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• These soils are unsuited to dwellings because of the slope, the depth to bedrock, the high content of rock fragments, and the very severe hazard of erosion.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• These soils are unsuited to septic tank absorption fields because of the slope, the depth to bedrock, and the high content of rock fragments.

Interpretive Groups

Land capability classification: VIIe

BrB—Blairton silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops
Size of areas: 5 to 15 acres
Major uses: Cropland, hayland, and pasture

Composition

Blairton soil and similar components: 85 to 95 percent
Contrasting components: 5 to 15 percent

Minor Components

Similar components:
• Soils that are deeper to bedrock than the Blairton soil
• Soils that are well drained
• Soils that have more clay in the subsoil than the Blairton soil

Contrasting components:
• The fine-silty Tilsit soils that have a fragipan

Typical Profile

Surface layer:
0 to 4 inches; very dark grayish brown silt loam

Subsurface layer:
4 to 9 inches; yellowish brown silt loam

Subsoil:
9 to 35 inches; yellowish brown silt loam and gravelly silt loam

Bedrock:
35 to 42 inches; yellowish brown ironstone and soft, layered shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: At a depth of 18 to 30 inches
Available water capacity: Low
Permeability: Moderately slow
Parent material: Silty residuum derived from shale and sandstone of the Bedford Formation and sandstone, siltstone, and shale of the Borden Formation; Mississippian System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Planting and harvesting may need to be delayed because of the seasonal high water table.
• The crops selected for planting should be those that can tolerate wetness and have a moderate root system.
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate wetness for short periods.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White ash, sugar maple, hickory, scarlet oak, yellow-poplar, white oak, northern red oak

Some preferred trees for planting: Eastern white pine, northern red oak, white oak, yellow-poplar, white ash
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can tolerate slightly wet conditions, have a moderately deep root system, and can withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the moderately slow permeability of the subsoil affecting camp areas, picnic areas, and playgrounds.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• If buildings with basements are constructed, care should be taken to select sites where the depth to bedrock is adequate.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderately slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the moderate depth to bedrock.

Interpretive Groups

Land capability classification: IIe

BrC2—Blairton silt loam, 6 to 12 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 65 acres
Major uses: Cropland, hayland, and pasture

Composition

Blairton soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are deeper to bedrock than the Blairton soil
• Soils that contain more silt or clay in the subsoil than the Blairton soil
• Soils that are well drained
• Soils that are less sloping or have steeper slopes than the Blairton soil

Contrasting components:
• The fine-silty Tilsit soils that have a fragipan

Typical Profile

Surface layer:
0 to 2 inches; very dark grayish brown silt loam

Subsurface layer:
2 to 5 inches; yellowish brown silt loam

Subsoil:
5 to 31 inches; yellowish brown silt loam and gravelly silt loam

Bedrock:
31 to 38 inches; yellowish brown ironstone and soft, layered shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate

Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: At a depth of 18 to 30 inches
Available water capacity: Low
Permeability: Moderately slow
Parent material: Silty residuum derived from shale and sandstone of the Bedford Formation and sandstone, siltstone, and shale of the Bordon Formation; Mississippian System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Planting and harvesting may need to be delayed because of the seasonal high water table.
• The crops selected for planting should be those that can tolerate wetness and have a moderate root system.
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate wetness for short periods.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White ash, sugar maple, hickory, scarlet oak, yellow-poplar, white oak, northern red oak
Some preferred trees for planting: Eastern white pine, northern red oak, white oak, yellow-poplar, white ash
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
• The species selected for planting should be those that can tolerate wetness, have a moderately deep root system, and can withstand heavy foot traffic and vehicular traffic.
• Playgrounds should be restricted to areas of similar included soils having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.
• Installation of a drainage system helps to overcome the seasonal high water table and the moderately slow permeability of the subsoil affecting camp areas and picnic areas.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.

• If buildings with basements are constructed, care should be taken to select sites where the depth to bedrock is adequate.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderately slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the moderate depth to bedrock.

Interpretive Groups

Land capability classification: IIIe

BrE2—Blairton silt loam, 12 to 30 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 350 acres
Major uses: Hayland, pasture, and woodland

Composition

Blairton soil and similar components: 85 to 95 percent
Contrasting components: 5 to 15 percent

Minor Components

Similar components:
• Soils that are deeper to bedrock than the Blairton soil
• Soils that contain more silt or clay in the subsoil than the Blairton soil
• Soils that are well drained
• Soils that have slopes of less than 12 percent or more than 30 percent

Contrasting components:
• The loamy-skeletal, well drained Berks and Brownsville soils that have more rock fragments at the surface than the Blairton soil
• The well drained Shelocta soils that are deeper to bedrock than the Blairton soil

Typical Profile

Surface layer:
0 to 2 inches; very dark grayish brown silt loam

Subsurface layer:
2 to 5 inches; yellowish brown silt loam

Subsoil:
5 to 31 inches; yellowish brown silt loam and gravelly silt loam

Bedrock:
31 to 38 inches; yellowish brown ironstone and soft, layered shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: At a depth of 18 to 30 inches
Available water capacity: Low
Permeability: Moderately slow
Parent material: Silty residuum derived from shale and sandstone of the Bedford Formation and sandstone, siltstone, and shale of the Borden Formation; Mississippian System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Generally unsuited
Management considerations:
• Although this soil is generally unsuited to cropland, it is poorly suited in areas where the slope is less than 20 percent.
• If the slope is less than 20 percent and the soil is cultivated only occasionally, contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and managing crop residue help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• Diversions can help to control runoff and overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory

ground cover and can tolerate wetness for short periods.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.
• If the slope is more than 20 percent, this soil is better suited to permanent pasture than to hayland because of an equipment limitation.

Woodland

Suitability: Suited
Some common trees: White ash, sugar maple, yellow-poplar, hickory, scarlet oak, white oak
Some preferred trees for planting: Eastern white pine, northern red oak, white oak, yellow-poplar, white ash
Management considerations:
• The hazard of erosion, the equipment limitation, and plant competition are the main management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• Land grading and land shaping help to overcome the slope.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Land grading and land shaping help to overcome the slope.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderately slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the moderate depth to bedrock.
• Land grading and land shaping help to overcome the slope.

Interpretive Groups

Land capability classification: IVe

Bs—Boonesboro silt loam, frequently flooded

Setting

Landform: Narrow and moderately wide stream valleys
Landscape position: Flood plains
Slope: 0 to 3 percent
Size of areas: 5 to 130 acres
Major uses: Pasture and woodland

Composition

Boonesboro soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that do not have a dark surface layer
• Soils that have a higher content of coarse fragments than the Boonesboro soil

Contrasting components:
• The very deep Woolper soils that have a fine textured control section and are on the adjacent footslopes

• The very deep Kinnick soils that have a fine-silty control section

Typical Profile

Surface layer:
0 to 10 inches; dark brown silt loam

Subsoil:
10 to 25 inches; brown gravelly silt loam and very gravelly silty clay loam

Bedrock:
25 inches; hard, layered limestone interbedded with thin, clayey shale layers

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate or high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Rapid
Parent material: Loamy, local alluvium derived from limestone and calcareous shales of the Quaternary System deposited over limestone bedrock of the Grant Lake and Bull Fork Formations; Ordovician System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Flooding: Frequent, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Installing berms or levees helps to control flooding.
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Diversions can help to control runoff and overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American sycamore, black walnut, hackberry, sweetgum, white ash, yellow-poplar
Some preferred trees for planting: Eastern cottonwood, sweetgum, white ash, yellow-poplar
Management considerations:
• The seedling mortality rate and plant competition are the main management concerns.
• The seedling mortality rate can be high unless trees that can tolerate the flooding are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• This soil is severely limited as a site for campgrounds and playgrounds because of the flooding.
• Recreational development should be restricted to picnic areas, paths and trails, and other noncamping uses.
• The species selected for planting should be those that can withstand slightly droughty conditions and heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season; tolerate

frequent, brief periods of flooding; and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around the ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Unsuited
Management considerations:
• This soil is unsuited to building site development because of the flooding and the depth to bedrock.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding and the depth to bedrock.

Interpretive Groups

Land capability classification: IIw

BvF2—Brownsville-Berks complex, 30 to 60 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to several hundred acres
Major uses: Woodland

Composition

Brownsville soil and similar components: 40 to 50 percent
Berks soil and similar components: 40 to 45 percent
Contrasting components: 5 to 20 percent

Minor Components

Similar components:
• Soils that have more silt in the control section than the Berks soil
• Soils that are less than 20 inches deep to bedrock or have a lower content of rock fragments in the subsoil than the Berks soil
• Soils that have a higher pH value throughout than the Brownsville soil
• Soils that have an argillic horizon or have a lower content of rock fragments in the subsoil than the Brownsville soil
• Soils that are not so eroded as the Berks soil or the Brownsville soil

Contrasting components:
• The moderately well drained Blairton soils
• The fine-loamy Shelocta soils

Typical Profile

Brownsville

Surface layer:
0 to 4 inches; brown very channery loam

Subsoil:
4 to 43 inches; yellowish brown channery and very channery silt loam and very channery loam

Substratum:
43 to 62 inches; yellowish brown extremely channery loam

Bedrock:
62 inches; hard, fine grained sandstone

Berks

Surface layer:
0 to 3 inches; brown channery silt loam

Subsoil:
3 to 25 inches; brown and yellowish brown channery, very channery, and extremely channery loam

Bedrock:
25 inches; hard, fine grained sandstone

Soil Properties and Qualities

Brownsville

Depth class: Very deep and deep
Depth to bedrock: 40 to 72 inches
Organic matter content: Moderately low or moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: Less than 1 percent
Available water capacity: Moderate
Permeability: Moderate or moderately rapid
Parent material: Loamy colluvium derived from sandstone, siltstone, and shale of the Borden Formation; Mississippian System
Runoff: Very rapid
Shrink-swell potential: Low

Hazard of erosion: Severe

Berks

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: Less than 1 percent
Available water capacity: Very low
Permeability: Moderate or moderately rapid
Parent material: Loamy residuum derived from sandstone, siltstone, and shale of the Borden Formation; Mississippian System
Runoff: Very rapid
Shrink-swell potential: Low
Hazard of erosion: Severe; scouring and rill erosion in some areas

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• These soils are unsuited to cropland because of the slope, the depth to bedrock, the high content of rock fragments, droughtiness, and the very severe hazard of erosion.

Hayland and Pasture

Suitability: Unsuited
Management considerations:
• These soils are unsuited to hayland and pasture because of the slope, the depth to bedrock, the high content of rock fragments, the droughtiness, and the very severe hazard of erosion.

Woodland

Suitability: Suited
Some common trees: Cool slopes—scarlet oak, chestnut oak, northern red oak, black oak, white oak, red maple; warm slopes—Virginia pine, chestnut oak, hickory, red maple
Some preferred trees for planting: Cool slopes—eastern white pine, yellow-poplar, white oak, hickory, white ash; warm slopes—Virginia pine, eastern white pine, white oak, hickory
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Because the Berks soil is only moderately deep and has a very low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Seedling mortality is a more limiting factor on warm slopes than on cool slopes.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Unsuited
Management considerations:
• These soils are unsuited to most recreational development because of the depth to bedrock, the high content of rock fragments, the droughtiness, and the very severe hazard of erosion.
• Recreational development should be restricted to paths and trails.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• These soils are unsuited to dwellings because of the slope, the depth to bedrock, the high content of rock fragments, the droughtiness, and the very severe hazard of erosion.

Septic Tank Absorption Fields

Suitability: Unsuited

Management considerations:
• These soils are unsuited to septic tank absorption fields because of the slope, the depth to bedrock, and the high content of rock fragments.

Interpretive Groups

Land capability classification: VIIe

CaE2—Caneyville-Hagerstown-Rock outcrop complex, 12 to 45 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Upper side slopes
Size of areas: 5 to several hundred acres
Major uses: Pasture and woodland

Composition

Caneyville soil and similar components: 40 to 45 percent
Hagerstown soil and similar components: 25 to 30 percent
Rock outcrop: 10 to 15 percent
Contrasting components: 10 to 25 percent

Minor Components

Similar components:
• Soils that are less than 20 inches deep to bedrock
• Soils having a coarser textured surface layer than that of the Caneyville soil; in and below dolomite ledge exposures
• Soils that have a browner subsoil than that of the Caneyville soil
• Soils that have a darker surface layer or a browner subsoil than that of the Hagerstown soil

Contrasting components:
• The deep Beasley soils that have a brown solum over paralithic contact
• The moderately deep Shrouts soils

Typical Profile

Caneyville

Surface layer:
0 to 7 inches; brown silt loam

Subsoil:
7 to 31 inches; yellowish red silty clay loam, silty clay, and clay

Bedrock:
31 inches; hard, yellowish brown (10YR 5/6), coarse grained dolomite

Hagerstown

Surface layer:
0 to 4 inches; dark yellowish brown silt loam

Subsoil:
4 to 62 inches; strong brown silty clay loam and yellowish red clay

Bedrock:
62 inches; hard, yellowish brown (10YR 5/6), coarse grained dolomite

Soil Properties and Qualities

Caneyville

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 13 percent
Available water capacity: Low
Permeability: Moderately slow
Parent material: Clayey residuum derived from coarse grained dolomite of the Bisher Formation; Silurian System
Runoff: Very rapid
Tilth: Fair
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Hagerstown

Depth class: Very deep
Depth to bedrock: 60 to 84 inches
Organic matter content: Moderately low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 13 percent
Available water capacity: High
Permeability: Moderate
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation; Silurian System
Runoff: Very rapid
Tilth: Fair

Shrink-swell potential: Moderate
Hazard of erosion: Severe

Rock outcrop

The rock outcrop occurs as 3- to 25-foot-thick ledges of brown dolomite. It breaks off at the ledge exposures, forming boulders that are 5 to 25 feet across and 3 to 15 feet thick. The rock outcrop is medium gray to light bluish gray and weathers to reddish brown. Most of the rock outcrop is coarse grained, bioclastic, and locally vuggy and contains light gray chert and petroleum residue.

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the rock outcrop, and the very severe hazard of erosion are the main management concerns.
• The limitations are difficult and expensive to overcome.

Hayland and Pasture

Suitability: Hayland—unsuited; pasture—poorly suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.

Woodland

Suitability: Suited
Some common trees: Northern red oak, yellow-poplar, black oak, eastern redcedar, white oak, black cherry, white basswood
Some preferred trees for planting: Black walnut, eastern white pine, white oak, white ash
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• The rock outcrop and bluffs can restrict the use of wheeled and tracked equipment.
• A cable yarding system generally is safer than other logging methods and causes less soil disturbance.
• Because the Caneyville soil is only moderately deep and a has low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and moderate foot traffic.
• Recreational development should be restricted to paths and trails.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• The slope, low strength, the depth to bedrock, the flagstones, and the rock ledges are the major management concerns.
• The limitations are difficult and expensive to overcome.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the flagstones, and the rock ledges are the major management concerns.
• The limitations are difficult and expensive to overcome.

Interpretive Groups

Land capability classification: Caneyville and Hagerstown—VIe; Rock outcrop—VIIIs

CeE2—Caneyville-Rock outcrop complex, 12 to 30 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 120 acres
Major uses: Pasture and woodland

Composition

Caneyville soil and similar components: 60 to 85 percent
Rock outcrop: 10 to 15 percent
Contrasting components: 10 to 25 percent

Minor Components

Similar components:
• Soils that are not so red in the subsoil as the Caneyville soil
• Soils that are underlain by shale
• Soils that are not so eroded or are more severely eroded than the Caneyville soil

Contrasting components:
• Soils that are more than 40 inches or less than 20 inches deep to bedrock
• The fine-loamy Gilpin soils

Typical Profile

Caneyville

Surface layer:
0 to 7 inches; brown silt loam

Subsoil:
7 to 31 inches; yellowish red silty clay loam, silty clay, and clay

Bedrock:
31 inches; hard limestone

Soil Properties and Qualities

Caneyville

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 14 percent
Available water capacity: Low
Permeability: Moderately slow
Parent material: Clayey residuum derived from limestone and shale of the Newman Limestone Formation; Mississippian System
Runoff: Very rapid
Tilth: Fair
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Rock outcrop

The rock outcrop occurs as 3- to 10-foot-thick ledges of white, olive, gray, or light brown, fine to coarsely crystalline, thin- to thick-bedded, occasionally cherty limestone. It breaks off at the ledge exposures, forming boulders 1 to 15 feet across and 3 to 10 feet thick.

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the rock outcrop, and the very severe hazard of erosion are the main management concerns.
• The limitations are difficult and expensive to overcome.

Hayland and Pasture

Suitability: Hayland—unsuited; pasture—poorly suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• This map unit should be restricted to use as woodland in areas of inclusions that have slopes of more than 30 percent.

Woodland

Suitability: Suited
Some common trees: Northern red oak, yellow-poplar, black oak, eastern redcedar, white oak
Some preferred trees for planting: White oak, white ash, northern red oak, eastern white pine

Management considerations:
• The hazard of erosion, the equipment limitation, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• The rock outcrop and the bluffs can restrict the use of wheeled and tracked equipment.
• A cable yarding system generally is safer than other logging methods and causes less soil disturbance.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and moderate foot traffic.
• Recreational development should be restricted to paths and trails.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• The slope, low strength, the depth to bedrock, the flagstones, and the rock ledges are the major management concerns.
• The limitations are difficult and expensive to overcome.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the flagstones, and the rock ledges are the major management concerns.
• The limitations are difficult and expensive to overcome.

Interpretive Groups

Land capability classification: Caneyville—VIe; Rock outcrop—VIIIs

ChB—Chavies fine sandy loam, 2 to 6 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Terraces
Size of areas: 5 to 55 acres
Major uses: Cropland, hayland, and pasture

Composition

Chavies soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that have less sand in the surface layer than the Chavies soil
• Soils that have a darker surface layer than that of the Chavies soil
• Soils that have gravel at a depth of 36 or more inches

Contrasting components:
• The fine-silty, somewhat poorly drained Newark soils that are in the lower landscape positions and are subject to occasional flooding
• The fine-loamy Wheeling soils
• The Lakin soils that have more sand in the subsoil than the Chavies soil

Typical Profile

Surface layer:
0 to 8 inches; brown fine sandy loam

Subsoil:
8 to 54 inches; dark yellowish brown fine sandy loam

Substratum:
54 to 66 inches; yellowish brown loamy fine sand

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches

Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderately rapid
Parent material: Sandy, nonlocal alluvium, eolian sands, and glacial outwash; Quaternary System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent terraces or uplands.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.
• Building fences along streams to restrict livestock access helps to control streambank erosion.

Woodland

Suitability: Well suited
Some common trees: White oak, black walnut, red maple, hickory
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, white oak, shortleaf pine
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Generally well suited
Management considerations:
• The contrasting included soils in the lower landscape positions are not suited to campgrounds or playgrounds because of the flooding and should be restricted to other uses.
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Generally well suited
Management considerations:
• The contrasting included soils in the lower landscape positions are not suited to building site development because of the flooding and should be restricted to other uses.
• Land shaping helps to overcome the slope on sites for small commercial buildings.

Septic Tank Absorption Fields

Suitability: Generally well suited
Management considerations:
• The contrasting included soils in the lower landscape positions are not suited to septic tank absorption fields because of the flooding.

• Increasing the size of septic tank absorption fields improves the filtering capacity of absorption areas and reduces the risk of ground water contamination.

Interpretive Groups

Land capability classification: IIe

ChC—Chavies fine sandy loam, 6 to 12 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Terraces
Size of areas: 5 to 55 acres
Major uses: Cropland, hayland, and pasture

Composition

Chavies soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have less sand in the surface layer than the Chavies soil
• Soils that have a darker surface layer than that of the Chavies soil
• Soils that have slopes of less than 6 percent or more than 12 percent

Contrasting components:
• The fine-silty, somewhat poorly drained Newark soils that are subject to occasional flooding
• The fine-silty, moderately well drained Otwell soils that have a fragipan
• The Lakin soils that have more sand in the subsoil than the Chavies soil

Typical Profile

Surface layer:
0 to 8 inches; brown fine sandy loam

Subsoil:
8 to 54 inches; dark yellowish brown fine sandy loam

Substratum:
54 to 66 inches; yellowish brown loamy fine sand

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderately rapid
Parent material: Sandy, nonlocal alluvium, eolian sands, and glacial outwash; Quaternary System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent terraces or uplands.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.

Woodland

Suitability: Well suited
Some common trees: White oak, black walnut, red maple, hickory
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, white oak, shortleaf pine
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be

controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The contrasting included soils in the lower landscape positions are not suited to campgrounds or playgrounds because of the flooding and should be restricted to other uses.
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
• Playgrounds should be restricted to areas of similar included soils having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Generally suited
Management considerations:
• The contrasting included soils in the lower landscape positions are unsuited to building site development because of the flooding.
• Land shaping helps to overcome the slope in most areas used for building site development.

Septic Tank Absorption Fields

Suitability: Generally suited
Management considerations:
• The contrasting included soils in the lower landscape positions are not suited to septic tank absorption fields because of the flooding.
• Increasing the size of septic tank absorption fields improves the filtering capacity of absorption fields and reduces the risk of ground water contamination.

Interpretive Groups

Land capability classification: IIIe

CkF2—Colyer-Trappist silt loams, 12 to 60 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 195 acres
Major uses: Woodland

Composition

Colyer soil and similar components: 45 to 55 percent
Trappist soil and similar components: 30 to 40 percent
Contrasting components: 5 to 25 percent

Minor Components

Similar components:
• Soils that have a lower content of rock fragments than the Colyer soil
• Soils that have a higher content of rock fragments than the Trappist soil
• Severely eroded soils
• Soils that have a fine-silty control section

Contrasting components:
• The fine-loamy, moderately well drained Blairton soils
• Shale outcrops
• The very deep, fine-silty Covedale soils

Typical Profile

Colyer

Surface layer:
0 to 2 inches; dark brown silt loam

Subsoil:
2 to 12 inches; yellowish brown, strong brown, and yellowish red channery silty clay and very channery clay

Substratum:
12 to 19 inches; strong brown extremely channery clay

Bedrock:
19 inches; hard, layered, black, fissile shale

Trappist

Surface layer:
0 to 2 inches; brown silt loam

Subsoil:
2 to 7 inches; yellowish brown silty clay loam
7 to 20 inches; yellowish brown, mottled silty clay and very channery silty clay

Substratum:
20 to 30 inches; yellowish brown, mottled very channery clay

Bedrock:
30 inches; hard, layered, black, fissile shale

Soil Properties and Qualities

Colyer

Depth class: Shallow
Depth to bedrock: 8 to 20 inches
Organic matter content: Low or moderately low
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 5 to 15 percent
Available water capacity: Low
Permeability: Slow
Parent material: Clayey residuum derived from black, fissile shale of the Ohio Shale Formation of the Devonian System and the Sunbury Formation of the Mississippian System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Trappist

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 5 percent
Available water capacity: Moderate
Permeability: Slow
Parent material: Clayey residuum derived from black, fissile shale of the Ohio Shale Formation of the Devonian System and the Sunbury Formation of the Mississippian System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the shale outcrop, the very severe hazard of erosion, extreme acidity, and droughtiness are the main management concerns.
• The limitations are difficult and expensive to overcome.

Hayland and Pasture

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the shale outcroppings, the very severe erosion hazard, the extreme acidity, and the droughtiness are the main management concerns.
• The limitations are difficult and expensive to overcome.

Woodland

Suitability: Poorly suited
Some common trees: Black oak, chestnut oak, hickory, red maple, scarlet oak
Some preferred trees for planting: Shortleaf pine, Virginia pine, white oak
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Because the soils are shallow or moderately deep and have a very low or low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Unsuited

Management considerations:
• These soils are unsuited to most recreational development because of the slope, the depth to bedrock, the shale outcrop, the very severe erosion hazard, the extreme acidity, and the droughtiness.
• Establishing water bars on trails and roads helps to reduce the runoff rate and control erosion.
• Trails and roads should be established on the contour where possible.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• The slope, low strength, the depth to bedrock, and the shale outcrops are the major management concerns.
• The limitations are difficult and expensive to overcome.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the slow permeability, and the shale outcrops are the major management concerns.
• The limitations are difficult and expensive to overcome.

Interpretive Groups

Land capability classification: VIIe

CoB—Covedale silt loam, 2 to 6 percent slopes

Setting

Landform: Stream valleys
Landscape position: Toeslopes and fans
Size of areas: 5 to 15 acres
Major uses: Cropland, hayland, and pasture

Composition

Covedale soil and similar components: 75 to 90 percent
Contrasting components: 10 to 25 percent

Minor Components

Similar components:
• Soils that are moderately well drained
• Soils that have more clay in the subsoil than the Covedale soil

Contrasting components:
• The fine-loamy Shelocta soils

Typical Profile

Surface layer:
0 to 7 inches; dark yellowish brown silt loam

Subsoil:
7 to 67 inches; yellowish brown silty clay loam

Substratum:
67 to 71 inches; light gray and brownish yellow silty clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: 60 to more than 96 inches
Organic matter content: Moderately low or low
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty colluvium or residuum derived from black, fissile shales of the Ohio Shale Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to control overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• Because of the clayey nature of this soil, pastures are subject to hoof damage if they are grazed when the soil is wet.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, red maple, white oak, hickory, yellow-poplar
Some preferred trees for planting: Eastern white pine, shortleaf pine, white oak, yellow-poplar
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Suited
Management considerations:
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.

Interpretive Groups

Land capability classification: IIe

CoC2—Covedale silt loam, 6 to 12 percent slopes, eroded

Setting

Landform: Uplands and stream valleys
Landscape position: Toeslopes, side slopes, and fans
Size of areas: 5 to 115 acres
Major uses: Cropland, hayland, pasture, and woodland

Composition

Covedale soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are moderately well drained
• Soils that have more clay in the subsoil than the Covedale soil
• Soils that have slopes of less than 6 percent or more than 12 percent
• Soils that are not so eroded or are more severely eroded than the Covedale soil

Contrasting components:
• The fine-loamy Shelocta soils
• The moderately deep Trappist soils that have a clayey control section

Typical Profile

Surface layer:
0 to 5 inches; dark yellowish brown silt loam

Subsoil:
5 to 65 inches; yellowish brown silty clay loam

Substratum:
65 to 71 inches; light gray and brownish yellow, mottled silty clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: 60 to more than 86 inches
Organic matter content: Moderately low or low
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty colluvium or residuum derived from black, fissile shales of the Ohio Shale Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to control overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, red maple, white oak, hickory, yellow-poplar
Some preferred trees for planting: Eastern white pine, shortleaf pine, white oak, yellow-poplar
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
• Playgrounds should be restricted to areas of similar included soils having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Suited
Management considerations:
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by frost action and heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.
• Land grading and land shaping help to overcome the slope.

Interpretive Groups

Land capability classification: IIIe

CsD2—Covedale-Shrouts complex, 12 to 25 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Side slopes and footslopes
Shape of areas: 5 to 105 acres
Major uses: Hayland, pasture, and woodland
Erosion: Shrouts soil more susceptible to erosion

Composition

Covedale soil and similar components: 40 to 50 percent
Shrouts soil and similar components: 30 to 40 percent
Contrasting components: 10 to 30 percent

Minor Components

Similar components:
- Soils that are moderately well drained
- Soils that have more clay in the subsoil than the Covedale soil
- Soils are not so eroded or are more severely eroded than the Covedale soil
- Soils that are more severely eroded than the Shrouts soil
- Soils that are redder in the upper part of the subsoil than the Shrouts soil

Contrasting components:
- The fine-loamy Shelocta soils
- The moderately deep Trappist soils
- The deep Beasley soils

Typical Profile

Covedale

Surface layer:
0 to 5 inches; dark yellowish brown silt loam

Subsoil:
5 to 65 inches; yellowish brown silty clay loam

Substratum:
65 to 71 inches; light gray and brownish yellow, mottled silty clay

Shrouts

Surface layer:
0 to 3 inches; dark grayish brown silty clay loam

Subsoil:
3 to 20 inches; light olive brown, mottled silty clay and clay

Substratum:
20 to 30 inches; light olive gray silty clay

Bedrock:
30 to 40 inches; soft, light olive gray shale

Soil Properties and Qualities

Covedale

Depth class: Very deep
Depth to bedrock: 60 to more than 96 inches
Organic matter content: Moderately low or low
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty colluvium or residuum derived from black, fissile shale of the Ohio Shale Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Shrouts

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Very slow
Parent material: Clayey residuum derived from calcareous shales of the Upper Crab Orchard Formation; Silurian System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Covedale—generally poorly suited; Shrouts—unsuited
Management considerations:
- The Covedale soil is suited to cropland if it is cultivated only occasionally and the slope is less than 20 percent.
- Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the

soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to control overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• Because of the clayey nature of the Shrouts soil, pastures are subject to hoof damage if they are grazed when the soil is wet.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.

Woodland

Suitability: Well suited
Some common trees: Black oak, red maple, white oak, American beech, yellow-poplar, eastern redcedar
Some preferred trees for planting: Eastern white pine, shortleaf pine, white oak, yellow-poplar, hickory
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Because the Shrouts soil is only moderately deep and has a low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and moderate foot traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling in the subsoil of the Shrouts soil.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil, minimize the damage caused by frost action in areas of the Covedale soil, and prevent the damage caused by heavy vehicular traffic.
• Some areas may need to be stabilized to help prevent slippage during construction.

Septic Tank Absorption Fields

Suitability: Covedale—poorly suited; Shrouts—unsuited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the subsoil in the Covedale soil.
• Installing septic tank absorption fields on the contour or land grading helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: Covedale—IVe; Shrouts—VIs

CtD2—Covedale-Trappist silt loams, 12 to 20 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Side slopes and footslopes

Size of areas: 5 to 64 acres
Major uses: Hayland, pasture, and woodland

Composition

Covedale soil and similar components: 55 to 60 percent
Trappist soil and similar components: 25 to 30 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that have more clay in the subsoil than the Covedale soil
• Soils that are moderately well drained
• Soils that are not so eroded or are more severely eroded than the Covedale soil
• Soils that have more silt and less clay in the subsoil than the Trappist soil
• Soils that have a higher content of coarse fragments than the Trappist soil

Contrasting soils:
• The fine-loamy Shelocta soils
• The shallow, clayey-skeletal Colyer soils

Typical Profile

Covedale

Surface layer:
0 to 5 inches; dark yellowish brown silt loam

Subsoil:
5 to 65 inches; yellowish brown silty clay loam

Substratum:
65 to 71 inches; light gray and brownish yellow, mottled silty clay

Trappist

Surface layer:
0 to 2 inches; brown silt loam

Subsoil:
2 to 7 inches; yellowish brown silty clay loam
7 to 20 inches; yellowish brown, mottled silty clay and very channery silty clay

Substratum:
20 to 30 inches; yellowish brown, mottled very channery clay

Bedrock:
30 inches; hard, layered, black, fissile shale

Soil Properties and Qualities

Covedale

Depth class: Very deep
Depth to bedrock: 60 to more than 96 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty colluvium or residuum derived from black, fissile shale of the Ohio Shale Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Trappist

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Slow
Parent material: Clayey residuum derived from black, fissile shale of the Ohio Shale Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to control overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited

Management considerations:
• Because of the clayey nature of the Trappist soil, pastures are subject to hoof damage if they are grazed when the soil is wet.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.

Woodland

Suitability: Well suited
Some common trees: Black oak, red maple, Virginia pine, white oak, American beech, yellow-poplar
Some preferred trees for planting: Eastern white pine, shortleaf pine, white oak, yellow-poplar
Management considerations:
• The hazard of erosion, the equipment limitation, and plant competition are the main management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and moderate foot traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling of the subsoil in the Trappist soil.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil in both soils, minimize the damage caused by frost action in areas of the Covedale soil, and prevent the damage caused by heavy vehicular traffic.
• Some areas may need to be stabilized to help prevent slippage during construction.

Septic Tank Absorption Fields

Suitability: Covedale—poorly suited; Trappist—unsuited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the Covedale subsoil.
• Installing septic tank absorption fields on the contour or land grading helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: IVe

CtF2—Covedale-Trappist silt loams, 20 to 55 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to several hundred acres
Major uses: Woodland

Composition

Covedale soil and similar components: 50 to 60 percent
Trappist soil and similar components: 30 to 40 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that have more clay in the subsoil than the Covedale soil

- Soils that are not so eroded or are more severely eroded than the Covedale soil or the Trappist soil
- Soils that have more silt and less clay in the subsoil than the Trappist soil
- Soils that have a higher content of coarse fragments in the subsoil than the Trappist soil
- Soils that have an illitic mineralogy

Contrasting components:
- The fine-loamy Shelocta soils
- The shallow, clayey-skeletal Colyer soils
- Black shale outcrops or exposed areas of black shale

Typical Profile

Covedale

Surface layer:
0 to 5 inches; dark yellowish brown silt loam

Subsoil:
5 to 65 inches; yellowish brown silty clay loam

Substratum:
65 to 71 inches; light gray and brownish yellow, mottled silty clay

Trappist

Surface layer:
0 to 2 inches; brown silt loam

Subsoil:
2 to 7 inches; yellowish brown silty clay loam
7 to 20 inches; yellowish brown, mottled very channery silty clay

Substratum:
20 to 30 inches; yellowish brown, mottled very channery clay

Bedrock:
30 inches; hard, layered, black, fissile shale

Soil Properties and Qualities

Covedale

Depth class: Very deep
Depth to bedrock: 60 to more than 96 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty colluvium or residuum derived from black, fissile shale of the Ohio Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Trappist

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Slow
Parent material: Clayey residuum derived from black, fissile shale of the Ohio Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
- The slope, the depth to bedrock, and the very severe hazard of erosion are the main management concerns.
- The limitations are difficult and expensive to overcome.

Hayland and Pasture

Suitability: Hayland—unsuited; pasture—poorly suited
Management considerations:
- The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
- Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
- A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
- The slope limits the use of farm machinery.
- This map unit should be restricted to use as woodland in areas where slope is more than 30 percent.

Woodland

Suitability: Suited
Some common trees: Black oak, red maple, Virginia pine, white oak, hickory, American beech
Some preferred trees for planting: Eastern white pine, shortleaf pine, white oak, yellow-poplar
Management considerations:
• The hazard of erosion, the equipment limitation, and plant competition are the main management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Unsuited
Management considerations:
• The slope and the very severe hazard of erosion are the major management concerns.
• The limitations are difficult to overcome.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• The slope, low strength, and the depth to bedrock are the major management concerns.
• The limitations are difficult and expensive to overcome.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The slope and the depth to bedrock are the major management concerns.
• The limitations are difficult and expensive to overcome.

Interpretive Groups

Land capability classification: VIIe

CxB—Crider silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops
Size of areas: 5 to 55 acres
Major uses: Cropland, hayland, and pasture

Composition

Crider soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have a darker surface layer than that of the Crider soil
• Soils that are deep to bedrock
• Soils that have more chert fragments in the subsoil than is defined as the range for the Crider soil

Contrasting components:
• The moderately well drained Nicholson soils that have a fragipan
• The fine textured Hagerstown soils
• Ashton soils that have a darker surface layer and less clay in the lower part of the solum than the Crider soil
• The deep, fine textured Beasley soils that are browner than the Crider soil

Typical Profile

Surface layer:
0 to 10 inches; brown silt loam

Subsurface layer:
10 to 17 inches; brown and dark yellowish brown silt loam

Subsoil:
17 to 39 inches; yellowish brown and strong brown, mottled silt loam
39 to 72 inches; yellowish red, mottled silty clay and clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderate

Natural fertility: High
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty material over clayey residuum derived from dolomitic limestone of the Bisher and Lower Crab Orchard Formations; Silurian System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low in the upper part of the subsoil and moderate in the lower part
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, black walnut, hickory, sugar maple, northern red oak
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, shortleaf pine, white ash
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Well suited
Management considerations:
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling of the subsoil.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.

Interpretive Groups

Land capability classification: IIe

EkB—Elk silt loam, 2 to 8 percent slopes

Setting

Landform: Stream valleys
Landscape position: Terraces along major streams
Size of areas: 5 to 15 acres
Major uses: Cropland, hayland, and pasture

Composition

Elk soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
- Soils having a thicker, darker surface layer than that of the Elk soil
- Soils that are moderately well drained
- Soils that have more clay in the subsoil than the Elk soil

Contrasting components:
- The frequently flooded Haymond soils that have a coarse-silty control section and are on flood plains
- The moderately well drained Otwell soils that have a fragipan
- The somewhat poorly drained, rarely flooded Morehead soils that have a lower base saturation in the subsoil than the Elk soil
- Shelocta soils that have more sand, a higher content of coarse fragments, and a lower base saturation in the subsoil than the Elk soil

Typical Profile

Surface layer:
0 to 8 inches; dark yellowish brown silt loam

Subsurface layer:
8 to 18 inches; dark yellowish brown silt loam

Subsoil:
18 to 66 inches; dark yellowish brown and yellowish brown silt loam and silty clay loam

Substratum:
66 to 75 inches; olive clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderate
Natural fertility: High
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Silty, local alluvium derived from limestone, siltstone, shale, and loess of the Quaternary System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
- Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
- Planting and harvesting may need to be delayed because of the flooding in areas of the included soils in the lower landscape positions.

Hayland and Pasture

Suitability: Well suited
Management considerations:
- The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding in areas of the included soils in the lower landscape positions.
- Pasture renovation should be frequent enough to maintain the desired species.
- A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
- Building fences along streams to restrict livestock access helps to control streambank erosion.
- A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American sycamore, black walnut, hackberry, pin oak, red maple
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak
Management considerations:
- Plant competition is the main management concern.
- Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
- See table 7 for additional information on woodland.

Recreation

Suitability: Well suited

Management considerations:
- The included contrasting soils that are in the lower landscape positions and are subject to flooding are not suited to camp areas or playgrounds and should be restricted to other uses
- The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
- The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
- If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
- Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Well suited
Management considerations:
- Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Well
Management considerations:
- Increasing the size of absorption fields helps to overcome the moderate permeability of the subsoil.
- Constructing absorption fields in a mound of suitable fill material helps to prevent inundation during periods of flooding in areas of the included contrasting soils in the lower landscape positions.

Interpretive Groups

Land capability classification: IIe

FaF2—Fairmount-Faywood complex, 20 to 55 percent slopes, very rocky, eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to several hundred acres
Major uses: Pasture and woodland

Composition

Fairmount soil and similar components: 50 to 60 percent
Faywood soil and similar components: 30 to 40 percent
Rock outcrop: 5 to 9 percent
Contrasting components: 1 to 11 percent

Minor Components

Similar components:
- Soils that have a lighter colored surface layer and a lower content of rock fragments throughout than the Fairmount soil
- Moderately deep soils
- Soils that are moderately deep to paralithic contact
- Soils that are not so eroded or are more severely eroded than the Faywood soil

Contrasting components:
- The very deep Woolper soils on footslopes and fans
- The deep Beasley soils on the upper side slopes

Typical Profile

Fairmount

Surface layer:
0 to 4 inches; dark brown very flaggy silty clay loam

Subsoil:
4 to 12 inches; light olive brown flaggy silty clay

Bedrock:
12 inches; hard limestone

Faywood

Surface layer:
0 to 4 inches; brown silty clay loam

Subsoil:
4 to 26 inches; olive brown silty clay and clay

Bedrock:
26 inches; hard limestone

Soil Properties and Qualities

Fairmount

Depth class: Shallow
Depth to bedrock: 10 to 20 inches
Organic matter content: Moderate or high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches

Extent of surface covered by rock fragments: 5 to 35 percent
Available water capacity: Very low
Permeability: Slow or moderately slow
Parent material: Clayey residuum derived from limestone and shale of the Bull Fork Formation; Ordovician System
Runoff: Rapid or very rapid
Tilth: Poor
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Faywood

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Extent of surface covered by rock fragments: 0 to 5 percent
Available water capacity: Low
Permeability: Slow or moderately slow
Parent material: Clayey residuum derived from limestone and shale of the Bull Fork Formation; Ordovician System
Runoff: Rapid or very rapid
Tilth: Fair
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Rock outcrop

The rock outcrop occurs as limestone ledges that are 5 to 6 feet across and 1 to 5 feet thick.

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the rock outcrop, droughtiness, the common limestone flagstones at the soil surface, and the severe hazard of erosion are the main management concerns.
• The limitations are difficult to overcome.

Hayland and Pasture

Suitability: Hayland—unsuited; pasture—poorly suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• The slopes limit the use of farm machinery.
• This map unit should be restricted to use as woodland in areas where slopes are more than 30 percent.

Woodland

Suitability: Suited
Some common trees: Black locust, chinkapin oak, sugar maple, eastern redcedar
Some preferred trees for planting: Eastern white pine, northern red oak, Virginia pine, white ash, white oak
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• The rock outcrop and the bluffs can restrict the use of wheeled and tracked equipment.
• A cable yarding system generally is safer than other logging methods and causes less soil disturbance.
• Because the soils are shallow or moderately deep and have a low or moderate available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Unsuited
Management considerations:
• These soils are unsuited to recreational development because of the slope, the depth to bedrock, the rock outcrop, the droughtiness, the common limestone flagstones on the surface, and the severe hazard of erosion.

Wildlife Habitat

Suitability: Suited

Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• The slope, low strength, the depth to bedrock, the flagstones, and the rock ledges are the major management concerns.
• The limitations are difficult and expensive to overcome.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, the flagstones, the rock ledges, and the slow or moderately slow permeability are the main management concerns.
• The limitations are difficult to overcome.

Interpretive Groups

Land capability classification: VIIe

GnD2—Gilpin silt loam, 6 to 20 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 95 acres
Major uses: Cropland, hayland, and pasture

Composition

Gilpin soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are less than 20 inches or more than 40 inches deep to bedrock
• Soils that have a loamy surface layer
• Soils that have a redder, more clayey subsoil than the Gilpin soil
• Soils that are not so eroded or are more severely eroded than the Gilpin soil

Contrasting components:
• The moderately well drained Blairton soils

Typical Profile

Surface layer:
0 to 5 inches; dark grayish brown and brown silt loam

Subsurface layer:
5 to 11 inches; light yellowish brown loam

Subsoil:
11 to 32 inches; yellowish brown and strong brown channery loam and very channery loam

Bedrock:
32 to 36 inches; soft, layered shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Moderate
Parent material: Loamy residuum derived from shale, siltstone, and sandstone of the Borden Formation of the Mississippian System and from sandstone and shale of the undivided Breathitt and Lee Formations of the Pennsylvanian System
Runoff: Medium or rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.

- Pasture renovation should be frequent enough to maintain the desired species.
- A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
- A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White oak, northern red oak, yellow-poplar, hickory
Some preferred trees for planting: Virginia pine, eastern white pine, yellow-poplar
Management considerations:
- Plant competition is the main management concern.
- Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
- See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
- Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
- The species selected for planting should be those that can withstand slightly droughty conditions and heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
- The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
- If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
- Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Poorly suited
Management considerations:
- For buildings with basements, care should be taken to select sites with adequate depth to bedrock.
- Land grading and land shaping help to overcome the slope.
- Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil, minimize the damage caused by frost action, and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
- Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the moderate depth to bedrock
- Land grading and land shaping help to overcome the slope.

Interpretive Groups

Land capability classification: IVe

GnE2—Gilpin silt loam, 20 to 45 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to several hundred acres
Major uses: Hayland, pasture, and woodland

Composition

Gilpin soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
- Soils that are less than 20 inches or more than 40 inches deep to bedrock
- Soils that are redder in the subsoil than the Gilpin soil
- Soils that are not so eroded or are more severely eroded than the Gilpin soil

Contrasting components:
- The moderately well drained Blairton soils
- The deep Shelocta soils
- Small areas of sandstone rock outcrop

Typical Profile

Surface layer:
0 to 5 inches; dark grayish brown and brown silt loam

Subsurface layer:
5 to 11 inches; light yellowish brown loam

Subsoil:
11 to 32 inches; yellowish brown and strong brown channery loam and very channery loam

Bedrock:
32 to 36 inches; soft, layered shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Moderate
Parent material: Loamy residuum derived from shale, siltstone, and sandstone of the Nancy and Nada Members of the Borden Formation of the Mississippian System and from sandstone and shale of the undivided Breathitt and Lee Formations of the Pennsylvanian System
Runoff: Medium or rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, and the very severe hazard of erosion are the main management concerns.
• The limitations are difficult and expensive to overcome.

Hayland and Pasture

Suitability: Hayland—unsuited; pasture—poorly suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• The slope limits the use of farm machinery.
• This map unit should be restricted to use as woodland in areas where slopes are more than 30 percent.

Woodland

Suitability: Suited
Some common trees: Warm slopes—northern red oak, white oak, hickory, chestnut oak; cool slopes—white oak, yellow-poplar, hickory, white ash
Some preferred trees for planting: Warm and cool slopes—Virginia pine, eastern white pine, white oak, yellow-poplar
Management considerations:
• The hazard of erosion, the equipment limitation, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and moderate foot or vehicular traffic.
• Recreational development should be restricted to paths and trails.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
• The slope and the depth to bedrock are the main management concerns.

• The limitations are difficult and expensive to overcome.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The slope and the depth to bedrock are the major management concerns.
• The limitations are difficult to overcome.

Interpretive Groups

Land capability classification: VIe

HgB—Hagerstown silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops
Size of areas: 5 to 30 acres
Major uses: Cropland, hayland, and pasture

Composition

Hagerstown soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that have a darker surface layer than that of the Hagerstown soil
• Soils that have more clay in the lower part of the solum than the Hagerstown soil
• Soils that have slopes of more than 6 percent

Contrasting components:
• The moderately well drained, fine-silty Nicholson soils that have a fragipan
• The Beasley soils that have a browner and thinner solum than that of the Hagerstown soil
• The fine-silty Crider soils that are redder and more clayey in the lower part of the subsoil than the Hagerstown soil

Typical Profile

Surface layer:
0 to 8 inches; dark yellowish brown silt loam

Subsoil:
8 to 62 inches; strong brown and yellowish red silty clay loam and clay

Bedrock:
62 inches; hard, brown, coarse grained dolomite

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: 60 to 84 inches
Organic matter content: Moderately low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation; Silurian System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White oak, black walnut, hickory, sugar maple, white ash, northern red oak
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, white oak, white ash

Management considerations:
- Plant competition is the main management concern.
- Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
- See table 7 for additional information on woodland.

Recreation

Suitability: Well suited
Management considerations:
- The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
- The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
- If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Suited
Management considerations:
- Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling of the subsoil.
- Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
- Increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.

Interpretive Groups

Land capability classification: IIe

HgC—Hagerstown silt loam, 6 to 12 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 85 acres
Major uses: Cropland, hayland, pasture, and urban and residential developments

Composition

Hagerstown soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
- Soils that have a darker surface layer than that of the Hagerstown soil
- Soils that have more clay in the lower part of the solum than the Hagerstown soil
- Soils that are moderately eroded
- Soils having slopes of less than 6 percent or more than 12 percent

Contrasting components:
- The fine-silty Nicholson soils that have a fragipan
- The fine-silty Crider soils that are redder and more clayey in the lower part of the subsoil than the Hagerstown soil
- The Beasley soils that have a browner and thinner solum than that of the Hagerstown soil

Typical Profile

Surface layer:
0 to 8 inches; dark yellowish brown silt loam

Subsoil:
8 to 62 inches; strong brown and yellowish red silty clay loam and clay

Bedrock:
62 inches; hard, brown, coarse grained dolomite

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: 60 to 84 inches
Organic matter content: Moderately low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation; Silurian System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited

Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White oak, black walnut, hickory, sugar maple, white ash, northern red oak
Some preferred trees for planting: Black walnut, eastern white pine, white oak, white ash
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
• Playgrounds should be restricted to areas of similar included soils having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Suited
Management considerations:
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling of the subsoil.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.
• Land grading and land shaping help to overcome the slope.

Interpretive Groups

Land capability classification: IIIe

Hn—Haymond silt loam, frequently flooded

Setting

Landform: Narrow and moderately wide stream valleys
Landscape position: Flood plains
Slope: 0 to 3 percent
Size of areas: 5 to 185 acres
Major uses: Cropland, hayland, and pasture (fig. 10)

Composition

Haymond soil and similar components: 85 to 95 percent
Contrasting components: 5 to 15 percent

Minor Components

Similar components:
• Soils that have a darker surface layer than that of the Haymond soil
• Soils that are along streambanks and have slopes of more than 3 percent

Figure 10.—Rolled hay in an area of Haymond silt loam, frequently flooded.

- Soils that are moderately well drained
- Soils having less sand and more clay in the subsoil than the Haymond soil

Contrasting components:
- The somewhat poorly drained, fine-silty Newark soils
- The poorly drained, fine-silty Melvin soils

Typical Profile

Surface layer:
0 to 6 inches; dark yellowish brown silt loam

Subsoil:
6 to 65 inches; yellowish brown silt loam

Substratum:
65 to 95 inches; yellowish brown silt loam

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low or moderate
Natural fertility: High
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Very high
Permeability: Moderate
Parent material: Silty, local alluvium derived from limestone, siltstone, shale, and loess of the Quaternary System
Runoff: Slow
Tilth: Good
Shrink-swell potential: Low
Flooding: Frequent, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Well suited

Management considerations:
• Installing berms or levees helps to control the flooding.
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• Diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Yellow-poplar, white oak, black walnut, American sycamore, hickory, sweetgum
Some preferred trees for planting: Swamp white oak, bur oak, black walnut, black cherry, pin oak
Management considerations:
• The seedling mortality rate and plant competition are the major management concerns.
• The seedling mortality rate can be high unless trees that can tolerate the flooding are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• This soil is severely limited as a site for campgrounds and playgrounds because of the flooding.
• Recreational development should be restricted to picnic areas, paths and trails, and other noncamping uses.
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate frequent, brief periods of flooding and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Unsuited
Management considerations:
• This soil is unsuited to building site development because of the flooding.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding.

Interpretive Groups

Land capability classification: IIw

Kn—Kinnick silt loam, occasionally flooded

Setting

Landform: Stream valleys
Landscape position: Flood plains
Slope: 0 to 3 percent
Size of areas: 5 to several hundred acres
Major uses: Cropland, hayland, and pasture

Composition

Kinnick soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
- Soils that have a darker surface layer and more clay in the subsoil than the Kinnick soil
- Soils that are moderately well drained
- Soils that have a higher content of coarse fragments than the Kinnick soil

Contrasting components:
- The somewhat poorly drained Newark soils
- The coarse-silty Haymond soils
- The moderately deep, fine-loamy Boonesboro soils

Typical Profile

Surface layer:
0 to 9 inches; dark yellowish brown silt loam

Subsoil:
9 to 31 inches; yellowish brown, mottled silt loam
31 to 55 inches; yellowish brown silt loam

Substratum:
55 to 76 inches; yellowish brown silt loam and gravelly silt loam with gray and brown redoximorphic features

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderate
Natural fertility: High
Drainage class: Well drained
Seasonal high water table: At a depth of 42 to 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Loamy, local alluvium derived from limestone, siltstone, and shale of the Quaternary System
Runoff: Very slow
Tilth: Good
Shrink-swell potential: Low
Flooding: Occasional, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
- Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
- Installing berms or levees helps to control the flooding.
- Diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
- The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
- Pasture renovation should be frequent enough to maintain the desired species.
- A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
- Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
- A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American sycamore, black walnut, eastern cottonwood, sweetgum, yellow-poplar, cherrybark oak
Some preferred trees for planting: Green ash, eastern cottonwood, pin oak, sweetgum, cherrybark oak
Management considerations:
- The seedling mortality rate and plant competition are the major management concerns.
- The seedling mortality rate can be high unless trees that can tolerate the flooding are selected for planting.
- Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
- See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited

Management considerations:
• This soil is limited as a site for campgrounds and playgrounds because of the flooding.
• Recreational development should be restricted to picnic areas, paths and trails, and other noncamping uses.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate occasional, brief periods of flooding and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Dwellings

Suitability: Unsuited
Management considerations:
• This soil is unsuitable as a site for dwellings because of the flooding.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding.

Interpretive Groups

Land capability classification: IIw

LkB—Lakin loamy sand, 2 to 8 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Terraces
Size of areas: 5 to 55 acres
Major uses: Cropland, hayland, and pasture

Composition

Lakin soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have their uppermost lamellae at a lower depth than those of the Lakin soil
• Soils that have an argillic horizon

Contrasting components:
• The coarse-loamy, well drained Chavies soils
• The fine-loamy, well drained Wheeling soils

Typical Profile

Surface layer:
0 to 12 inches; brown loamy sand

Subsoil:
12 to 58 inches; yellowish brown and brownish yellow sand and loamy sand with lamellae of strong brown or dark yellowish brown fine sandy loam

Substratum:
58 to 96 inches; brownish yellow sand

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low
Natural fertility: Medium
Drainage class: Excessively drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Rapid
Parent material: Fine and medium textured eolian sands and nonlocal alluvial deposits of the Quaternary System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Productivity is limited by the low available water capacity and the rapid permeability.
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.

• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• Diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• Productivity is limited by the low available water capacity and the rapid permeability.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Northern red oak, black oak
Some preferred trees for planting: Virginia pine, eastern white pine
Management considerations:
• The equipment limitation and the seedling mortality rate are the major management concerns.
• Because the surface layer of the soil is loose, it should be disturbed as little as possible.
• Because the soil has a low available water content, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• Playgrounds should be restricted to areas having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.
• The species selected for planting should be those that can withstand slightly droughty conditions and heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season; tolerate frequent, brief periods of flooding; and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Land shaping on sites for small commercial buildings helps to overcome the slope.
• Caution is needed on sites for shallow excavations because of the loose nature of the soil material and the instability of cutbanks.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of septic tank absorption fields improves the filtering capacity of absorption fields and reduces the risk of ground water contamination.

Interpretive Groups

Land capability classification: IIIs

LkC—Lakin loamy sand, 8 to 15 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Terraces
Size of areas: 5 to 75 acres
Major uses: Cropland, hayland, and pasture

Composition

Lakin soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have their uppermost lamellae at a lower depth than those of the Lakin soil
• Soils that have an argillic horizon

Contrasting components:
- The coarse-loamy Chavies soils
- The fine-loamy Wheeling soils

Typical Profile

Surface layer:
0 to 12 inches; brown loamy sand

Subsoil:
12 to 58 inches; yellowish brown and brownish yellow sand and loamy sand with lamellae of strong brown or dark yellowish brown fine sandy loam

Substratum:
58 to 96 inches; brownish yellow sand

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low
Natural fertility: Medium
Drainage class: Excessively drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Rapid
Parent material: Fine and medium textured eolian sands and nonlocal alluvial deposits of the Quaternary System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
- Productivity is limited by the low available water capacity and the rapid permeability.
- Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
- Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
- Diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
- Productivity is limited by the low available water capacity and the rapid permeability.
- The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
- Pasture renovation should be frequent enough to maintain the desired species.
- A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
- Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
- A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Northern red oak, black oak
Some preferred trees for planting: Virginia pine, eastern white pine
Management considerations:
- The equipment limitation and the seedling mortality rate are the major management concerns.
- Because the surface layer of the soil is loose, it should be disturbed as little as possible.
- Because the soil has a low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
- See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
- The species selected for planting should be those that can withstand droughty conditions and heavy foot traffic and vehicular traffic.
- Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Well suited
Management considerations:
- The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season; tolerate frequent, brief periods of flooding; and meet the needs of the wildlife species for which they are managed.
- If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Caution is needed on sites for shallow excavations because of the loose nature of the soil material and the instability of cutbanks.
• Land shaping helps to overcome the slope.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of septic tank absorption fields improves the filtering capacity of absorption fields and reduces the risk of ground water contamination.
• Land shaping helps to overcome the slope.

Interpretive Groups

Land capability classification: IVs

LkE—Lakin loamy sand, 15 to 35 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Terraces and some upland side slopes above the Ohio River
Size of areas: 5 to 205 acres
Major uses: Hayland, pasture, and woodland

Composition

Lakin soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that have an argillic horizon

Contrasting components:
• The fine-loamy, well drained Wheeling soils
• The fine textured, moderately deep Faywood soils on the adjacent side slopes
• The fine textured, shallow Fairmount soils on the adjacent side slopes

Typical Profile

Surface layer:
0 to 12 inches; brown loamy sand

Subsoil:
12 to 58 inches; yellowish brown and brownish yellow sand and loamy sand with lamellae of strong brown or dark yellowish brown fine sandy loam

Substratum:
58 to 96 inches; brownish yellow sand

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low
Natural fertility: Medium
Drainage class: Excessively drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Rapid
Parent material: Fine and medium textured eolian sands and nonlocal alluvial deposits of the Quaternary System
Runoff: Rapid or very rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited

Hayland and Pasture

Suitability: Hayland—poorly suited; pasture—suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.
• The slope and loose surface material limit the use of farm machinery.

Woodland

Suitability: Well suited
Some common trees: Northern red oak, black oak

Some preferred trees for planting: Virginia pine, eastern white pine
Management considerations:
• The equipment limitation and the seedling mortality rate are the major management concerns.
• Because the surface layer of the soil is loose, tracked or specialized equipment should be used so that the soil is disturbed as little as possible.
• Because the soil has a low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand droughty conditions and heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season; tolerate frequent, brief periods of flooding; and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Caution is needed on sites for shallow excavations because of the loose nature of the soil material and the instability of cutbanks.
• Land shaping helps to overcome the slope.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Land shaping helps to overcome the slope.

Interpretive Groups

Land capability classification: VIIs

Lw—Lawrence silt loam

Setting

Landform: Uplands and river and stream valleys
Landscape position: Ridgetops and stream terraces
Slopes: 0 to 4 percent
Size of areas: 5 to several hundred acres
Major uses: Cropland, hayland, and pasture

Composition

Lawrence soil and similar components: 85 to 95 percent
Contrasting components: 5 to 15 percent

Minor Components

Similar components:
• Poorly drained soils that have a fragipan

Contrasting components:
• The moderately well drained Nicholson soils
• The moderately well drained, fine textured Aaron soils that do not have a fragipan
• The fine textured McGary soils that do not have a fragipan

Typical Profile

Surface layer:
0 to 9 inches; light olive brown silt loam

Upper part of the subsoil:
9 to 19 inches; brownish yellow, light brownish gray, and pale brown silt loam

Next part of the subsoil:
19 to 27 inches; a fragipan of pale brown and olive yellow, firm and brittle silt loam with brown and gray redoximorphic features
27 to 44 inches; a fragipan of light yellowish brown and brownish yellow, firm and brittle silt loam with brown and gray redoximorphic features

Lower part of the subsoil:
44 to 51 inches; light yellowish brown and brownish yellow silt loam with gray and olive redoximorphic features

Substratum:
51 to 61 inches; greenish gray, light yellowish brown, and olive yellow clay

Bedrock:
61 to 64 inches; soft, olive, layered, calcareous clay shale

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches

Depth to the fragipan: 18 to 26 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Somewhat poorly drained
Seasonal high water table: Depth—12 to 24 inches; kind—perched
Available water capacity: Moderate
Permeability: Moderate above the fragipan and slow and moderately slow in and below the fragipan
Parent material: Silty material over calcareous shales and dolomite of the Upper Crab Orchard Formation of the Silurian System on uplands and silty, local alluvium of the Quaternary System on stream terraces
Runoff: Very slow
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.
• The crops selected for planting should be those that can tolerate wetness and have a moderately deep root system.
• The seasonal high water table may delay planting and harvesting.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, have a moderately deep root system, and can tolerate both wetness and droughtiness.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Suited (fig. 11)
Some common trees: Black oak, hackberry, pin oak, red maple, sweetgum, yellow-poplar, American sycamore
Some preferred trees for planting: American sycamore, eastern white pine, pin oak, sweetgum, yellow-poplar
Management considerations:
• The equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Equipment should be operated only when the soil is dry.
• The seedling mortality rate can be high unless trees that can tolerate wetness are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate wetness and withstand heavy foot traffic and vehicular traffic.
• Recreational development should be restricted to picnic areas, playgrounds, and paths and trails because of the seasonal high water table.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness, have a moderate root system, and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Figure 11.—A woodlot in an area of Lawrence silt loam.

• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing buildings and roads on elevated, well compacted fill material helps to overcome the wetness and the low strength of the subsoil.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness.
• Increasing the size of absorption fields helps to overcome the restricted permeability, which is slow because of the fragipan.

Interpretive Groups

Land capability classification: IIIw

Mc—McGary silt loam

Setting

Landform: Uplands
Landscape position: Broad, flat ridgetops
Slope: 1 to 4 percent
Size of areas: 5 to 200 acres
Major uses: Cropland, hayland, and pasture

Composition

McGary soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have calcium carbonate in the upper part of the solum
• Soils that have more silt in the subsoil than the McGary soil
• Soils that are poorly drained

Contrasting components:
• The deep, moderately well drained Aaron soils
• The deep, well drained Beasley soils
• The fine-silty Lawrence soils that have a fragipan
• The fine-silty Nicholson soils that have a fragipan and are moderately well drained

Typical Profile

Surface layer:
0 to 10 inches; brown silt loam

Subsoil:
10 to 23 inches; brownish yellow silty clay loam with gray and brown redoximorphic features
23 to 36 inches; light brownish gray and brownish yellow silty clay with gray and brown redoximorphic features

Substratum:
36 to 61 inches; brownish yellow and light brownish gray clay with gray redoximorphic features

Bedrock:
61 inches; soft, layered, calcareous shale in shades of olive, gray, and green

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low and moderate
Natural fertility: Medium
Drainage class: Somewhat poorly drained
Seasonal high water table: Depth—12 to 36 inches; kind—apparent
Available water capacity: High
Permeability: Slow or very slow
Parent material: Silty and clayey alluvium of the Quaternary System and silty and clayey material over calcareous shale and dolomite of the Upper Crab Orchard Formation of the Silurian System
Runoff: Slow or medium
Tilth: Good
Shrink-swell potential: High
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• The crops selected for planting should be those that can tolerate wetness.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate wetness for short periods.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Suited
Some common trees: Green ash, sweetgum, hickory, pin oak, post oak
Some preferred trees for planting: American sycamore, eastern white pine, green ash, pin oak
Management considerations:
• The equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.

• Equipment should be operated only when the soil is dry.
• The seedling mortality rate can be high unless trees that can tolerate wetness are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate wetness and withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability of the subsoil on sites for campgrounds and playgrounds.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that are hydrophytic and meet the needs of the wildlife species for which they are managed.
• Prohibiting the installation of drainage systems helps to maintain the quality of wetlands.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing buildings and roads on elevated, well compacted fill material helps to overcome the wetness and the low strength of the subsoil and prevent the damage caused by shrinking and swelling of the subsoil.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness.

Interpretive Groups

Land capability classification: IIIw

Me—Melvin silt loam, frequently flooded

Setting

Landform: River and stream valleys
Landscape position: Flood plains
Slope: 0 to 2 percent
Size of areas: 5 to 75 acres
Major uses: Hayland and pasture

Composition

Melvin soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have layers with as much as 40 percent gravel below a depth of 40 inches
• Soils that are more acid throughout the profile than the Melvin soil
• Soils that are darker throughout than the Melvin soil

Contrasting components:
• The moderately well drained Otwell soils that have a fragipan
• The coarse-silty, well drained Haymond soils
• The somewhat poorly drained Newark soils
• Fine textured soils that have an argillic horizon and a thicker, darker surface layer than that of the Melvin soil

Typical Profile

Surface layer:
0 to 7 inches; light brownish gray and gray silt loam with red redoximorphic features

Subsoil:
7 to 21 inches; gray silt loam with reddish yellow redoximorphic features

Substratum:
21 to 70 inches; gray silt loam with brownish yellow redoximorphic features

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Poorly drained
Seasonal high water table: Depth—0 to 12 inches; kind—apparent
Available water capacity: High
Permeability: Moderate
Parent material: Mixed alluvium derived from limestone, siltstone, and shale of the Quaternary System

Runoff: Slow
Tilth: Good
Shrink-swell potential: Low
Flooding: Frequent, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited to some crops grown in the county where the soil has been previously drained and is protected from flooding
Management considerations:
• Constructing berms or levees helps to control flooding.
• The crops selected for planting should be those that can tolerate wetness.
• Planting may need to be delayed because of the seasonal high water table and the flooding.
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• Some hay crops may be damaged by flooding.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding for short periods.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Suited
Some common trees: American sycamore, green ash, hackberry, hickory, yellow birch, pin oak, sweetgum
Some preferred trees for planting: American sycamore, eastern cottonwood, pin oak, sweetgum, green ash, hickory
Management considerations:
• The equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Equipment should be operated only when the soil is dry.
• The seedling mortality rate can be high unless trees that can tolerate wetness and flooding are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Unsuited
Management considerations:
• This soil is unsuited to playgrounds, camp areas, and picnic areas because of the flooding and to golf fairways because of the wetness.

Wildlife Habitat

Suitability: Poorly suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness and brief periods of flooding and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Unsuited
Management considerations:
• This soil is unsuited to building site development because of the wetness and the flooding.

Septic Tank Absorption Fields

Suitability: Unsuited

Management considerations:
• This soil is unsuited to septic tank absorption fields because of the wetness and the flooding.

Interpretive Groups

Land capability classification: IIIw

Mo—Morehead silt loam, rarely flooded

Setting

Landform: River and stream valleys
Landscape position: Low terraces, alluvial fans, and footslopes
Slope: 0 to 4 percent
Size of areas: 5 to 50 acres
Major uses: Cropland, hayland, and pasture

Composition

Morehead soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are in similar landscape positions and do not have an argillic horizon or have a subsoil with more clay than the Morehead soil

Contrasting components:
• The moderately well drained Sees soils that have more clay in the subsoil than the Morehead soil
• The somewhat poorly drained Newark soils that do not have an argillic horizon

Typical Profile

Surface layer:
0 to 9 inches; dark yellowish brown silt loam

Subsoil:
9 to 32 inches; yellowish brown silt loam with brown and gray redoximorphic features
32 to 42 inches; yellowish brown silty clay loam with brown and gray redoximorphic features

Substratum:
42 to 48 inches; yellowish brown, pale brown, and light brownish gray silty clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Moderately well drained or somewhat poorly drained
Seasonal high water table: At a depth of 6 to 30 inches
Available water capacity: Very high
Permeability: Moderate
Parent material: Mixed, local and nonlocal alluvium derived from limestone, siltstone, and shale of the Quaternary System
Runoff: Very slow
Tilth: Good
Shrink-swell potential: Low
Flooding: Rare, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited
Management considerations:
• The crops selected for planting should be those that can tolerate wetness.
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• Constructing berms or levees helps to protect from flooding.
• Planting may need to be delayed because of the seasonal high water table and the flooding.
• In places diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• Some hay crops may be damaged by flooding.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate wetness.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Suited
Some common trees: Black oak, pin oak, red maple, white oak, yellow-poplar, river birch
Some preferred trees for planting: Eastern white pine, green ash, pin oak, shortleaf pine, sweetgum
Management considerations:
• The equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Equipment should be operated only when the soil is dry.
• The seedling mortality rate can be high unless trees that can tolerate wetness are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate wetness and withstand heavy foot traffic and vehicular traffic.
• Recreational development should be restricted to picnic areas and paths and trails because of the seasonal high water table and the flooding.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness and brief periods of flooding and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing buildings and roads on elevated, well compacted fill material helps to overcome the wetness, the flooding, and the low strength of the subsoil.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Building up or mounding sites for septic tank absorption fields with fill material and installing a drainage system around the absorption areas help to overcome the wetness and prevent inundation during periods of flooding.

Interpretive Groups

Land capability classification: IIw

Ne—Newark silt loam, occasionally flooded

Setting

Landform: River and stream valleys
Landscape position: Flood plains
Slope: 0 to 3 percent
Size of areas: 5 to 340 acres
Major uses: Cropland, hayland, and pasture

Composition

Newark soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are more acid throughout than the Newark soil
• Soils that are moderately well drained
• Soils that have more sand in the subsoil than the Newark soil

Contrasting components:
• The loamy-skeletal, well drained Skidmore soils
• The fine-loamy, well drained, moderately deep Boonesboro soils
• The well drained Nolin soils along the Ohio River
• The well drained Kinnick soils on flood plains along streams
• The poorly drained Melvin soils
• The well drained, coarse-silty Haymond soils on flood plains along streams

Typical Profile

Surface layer:
0 to 8 inches; brown and yellowish brown silt loam

Subsurface layer:
8 to 15 inches; yellowish brown silt loam with brown and gray redoximorphic features

Subsoil:
15 to 26 inches; light brownish gray silt loam with yellowish brown redoximorphic features

Substratum:
26 to 43 inches; light brownish gray silt loam with yellowish brown redoximorphic features
43 to 62 inches; brown very gravelly silt loam with gray redoximorphic features

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low or moderate
Natural fertility: High
Drainage class: Somewhat poorly drained
Seasonal high water table: Depth—6 to 18 inches; kind—apparent
Available water capacity: High
Permeability: Moderate
Parent material: Mixed alluvium from limestone, siltstone, shale, and loess of the Quaternary System
Runoff: Very slow
Tilth: Good
Shrink-swell potential: Low
Flooding: Occasional, brief periods
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Constructing berms or levees helps to control flooding.
• The crops selected for planting should be those that can tolerate wetness.
• Planting may need to be delayed because of the seasonal high water table and the flooding.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate wetness and short periods of flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Suited
Some common trees: Eastern cottonwood, green ash, pin oak, sweetgum
Some preferred trees for planting: American sycamore, eastern cottonwood, green ash, sweetgum
Management considerations:
• The equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Equipment should be operated only when the soil is dry.
• The seedling mortality rate can be high unless trees that can tolerate wetness and flooding are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate wetness and withstand heavy foot traffic and vehicular traffic.
• Recreational development should be restricted to picnic areas and paths and trails because of the seasonal high water table and the flooding.

Wildlife Habitat

Suitability: Suited

Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate slightly wet conditions during the growing season and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing buildings and roads on elevated, well compacted fill material helps to overcome the wetness, the flooding, and the low strength of the subsoil.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Building up or mounding sites for septic tank absorption fields with fill material and installing a drainage system around the absorption areas help to overcome the wetness and prevent inundation during periods of flooding.

Interpretive Groups

Land capability classification: IIw

NhB—Nicholson silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 65 acres
Major uses: Cropland, hayland, and pasture

Composition

Nicholson soil and similar components: 60 to 70 percent
Contrasting components: 30 to 40 percent

Minor Components

Similar components:
• Soils that are moderately well drained and do not have an identifiable fragipan
• Soils that have slopes of more than 6 percent

Contrasting components:
• The somewhat poorly drained Lawrence soils
• Aaron soils that have a fine textured subsoil and do not have a fragipan
• The somewhat poorly drained McGary soils that have a fine textured subsoil and do not have a fragipan
• The well drained Beasley soils that have a fine textured subsoil and do not have a fragipan

Typical Profile

Surface layer:
0 to 8 inches; brown silt loam

Subsoil:
8 to 24 inches; yellowish brown silt loam and silty clay loam with brown and gray redoximorphic features
24 to 42 inches; a fragipan of strong brown and brownish yellow, firm and brittle silty clay loam with gray redoximorphic features

Substratum:
42 to 61 inches; yellowish brown silty clay

Bedrock:
61 inches; hard dolomite

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Depth to the fragipan: 20 to 30 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: Depth—18 to 30 inches; kind—perched
Available water capacity: Moderate
Permeability: Slow
Parent material: Silty material underlain by clayey residuum derived from limestones, dolomitic limestones, siltstones, and calcareous shales of the Ordovician and Silurian Systems
Runoff: Slow or medium
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Because of the fragipan, the crops selected for planting should be those that can tolerate wetness and have a moderately deep root system.
• The seasonal high water table can delay planting and harvesting.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can tolerate both wetness and droughtiness, and have a moderately deep root system.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, hickory, northern red oak, sweetgum, white oak
Some preferred trees for planting: Eastern white pine, northern red oak, sweetgum, white ash, white oak
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that have a moderately deep root system, can tolerate both wet and dry conditions, and can withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability of the subsoil on sites for campgrounds and playgrounds.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate both wet and dry conditions, have a moderately deep root system, and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields helps to overcome the slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the limited depth to the fragipan.

Interpretive Groups

Land capability classification: IIe

NhC—Nicholson silt loam, 6 to 12 percent slopes

Setting

Landform: Uplands
Landscape position: Side slopes

Size of areas: 5 to 35 acres
Major uses: Cropland, hayland, and pasture

Composition

Nicholson soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are fine-silty, are moderately well drained, and do not have an identifiable fragipan
• Soils that have slopes of less than 6 percent or more than 12 percent
• Soils that are moderately eroded

Contrasting components:
• The fine textured Aaron soils that do not have a fragipan
• The well drained Beasley soils that have a fine textured subsoil and do not have a fragipan

Typical Profile

Surface layer:
0 to 8 inches; brown silt loam

Subsoil:
8 to 24 inches; yellowish brown silt loam and silty clay loam with brown and gray redoximorphic features
24 to 42 inches; a fragipan of strong brown and brownish yellow, firm and brittle silty clay loam with gray redoximorphic features

Substratum:
42 to 61 inches; yellowish brown silty clay

Bedrock:
61 inches; hard dolomite

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Depth to the fragipan: 20 to 30 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: Depth—18 to 30 inches; kind—perched
Available water capacity: Moderate
Permeability: Slow
Parent material: Silty material underlain by clayey residuum derived from limestones, siltstones, and calcareous shales of the Ordovician and Silurian Systems
Runoff: Medium
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Because of the fragipan, the crops selected for planting should be those that can tolerate wetness and have a moderately deep root system.
• The seasonal high water table can delay planting and harvesting.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can tolerate both wetness and droughtiness, and have a moderately deep root system.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, hickory, northern red oak, sweetgum, white oak
Some preferred trees for planting: Eastern white pine, northern red oak, sweetgum, white ash, white oak
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that have a moderately deep root system, can tolerate both wet and dry conditions, and can withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability of the subsoil on sites for campgrounds and playgrounds.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate both wet and dry conditions, have a moderately deep root system, and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.
• Land shaping helps to overcome the slope.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields helps to overcome the slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the limited depth to the fragipan
• Land shaping helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: IIIe

No—Nolin silt loam, occasionally flooded

Setting

Landform: Ohio River valley
Landscape position: Flood plains
Slope: 0 to 3 percent
Size of areas: 5 to several hundred acres
Major uses: Cropland, hayland, and pasture

Composition

Nolin soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that have a darker surface layer or more sand in the profile than the Nolin soil
• Soils that have a weak argillic horizon

Contrasting components:
• The somewhat poorly drained Newark soils
• The coarse-silty Haymond soils that are frequently flooded
• The Kinnick soils that have a seasonal high water table at a depth of 3.5 to 6.0 feet

Typical Profile

Surface layer:
0 to 7 inches; dark grayish brown silt loam

Subsoil:
7 to 60 inches; dark grayish brown silt loam

Substratum:
60 to 65 inches; brown silt loam

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderate
Natural fertility: High
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Loamy, nonlocal alluvium derived from limestone, siltstone, and shale of the Quaternary System
Runoff: Very slow
Tilth: Good
Shrink-swell potential: Low
Flooding: Occasional, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• Installing berms or levees helps to control the flooding.
• Diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding for short periods.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American sycamore, black walnut, eastern cottonwood, sweetgum, yellow-poplar
Some preferred trees for planting: Black walnut, eastern cottonwood, eastern white pine, sweetgum, white ash
Management considerations:
• The seedling mortality rate and plant competition are the major management concerns.
• The seedling mortality rate can be high unless trees that can tolerate the flooding are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• This soil is limited as a site for campgrounds and playgrounds because of the flooding.
• Recreational development should be restricted to picnic areas, paths and trails, and other noncamping uses.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate occasional, brief periods of flooding and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Unsuited
Management considerations:
• This soil is unsuited to building site development because of the flooding.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding.

Interpretive Groups

Land capability classification: IIw

OtB—Otwell silt loam, 2 to 6 percent slopes

Setting

Landform: River and stream valleys
Landscape position: Terraces
Size of areas: 5 to 170 acres
Major uses: Cropland, hayland, and pasture

Composition

Otwell soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
- Soils having a darker or more loamy surface layer than that of the Otwell soil
- Otwell soils that are in the lower landscape positions and are subject to rare flooding
- Soils that have a higher gravel content in the profile or below a depth of 40 inches than that of the Otwell soil

Contrasting components:
- Somewhat poorly drained Lawrence soils
- The well drained Elk soils that do not have a fragipan
- The somewhat poorly drained Morehead soils that do have a fragipan
- The well drained Beasley soils that have a fine textured subsoil, do not have a fragipan, and are in areas below footslopes

Typical Profile

Surface layer:
0 to 9 inches; dark grayish brown silt loam

Subsurface layer:
9 to 15 inches; yellowish brown and dark grayish brown silt loam

Subsoil:
15 to 29 inches; yellowish brown silt loam with brown redoximorphic features
29 to 65 inches; a fragipan of yellowish brown and dark yellowish brown, firm and brittle silt loam with gray and brown redoximorphic features

Soil Properties and Qualities

Depth class: Very deep
Depth to the fragipan: 20 to 30 inches
Depth to bedrock: More than 60 inches
Organic matter content: Low or moderately low
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: Depth—24 to 42 inches; kind—perched
Available water capacity: Moderate
Permeability: Very slow
Parent material: Old, mixed, local and nonlocal alluvium derived from limestone, siltstone, shale, and sandstone in the uplands; Quaternary System
Runoff: Moderately low
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
- Because of the fragipan, the crops selected for planting should be those that can tolerate wetness and have a moderately deep root system.
- The seasonal high water table can delay planting and harvesting.
- Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
- In places diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
- The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can tolerate both wetness and droughtiness, and have a moderately deep root system.
- Pasture renovation should be frequent enough to maintain the desired species.
- A good grazing system should include proper stocking rates and a rotation grazing system, along with salt and watering facilities to aid in the distribution of grazing.
- Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
- A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black gum, black oak, sugar maple, white oak, yellow-poplar
Some preferred trees for planting: Eastern white pine, white ash, white oak, yellow-poplar
Management considerations:
- Plant competition is the main management concern.

• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate both wetness and droughtiness and withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the very slow permeability of the subsoil on sites for campgrounds and playgrounds.
• Recreational development should be restricted to picnic areas and paths and trails in areas of the included soils that are in the lower landscape positions and subject to flooding.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand both wet and dry conditions, have a moderately deep root system, and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Generally suited
Management considerations:
• The included soils in the lower landscape positions are not suited to building site development because of the flooding.
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing buildings and roads on elevated, well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by shrinking and swelling of the subsoil.

Septic Tank Absorption Fields

Suitability: Generally poorly suited
Management considerations:
• The included soils in the lower landscape positions are not suited to septic tank absorption fields because of the flooding.
• Increasing the size of absorption fields helps to overcome the slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the limited depth to the fragipan.

Interpretive Groups

Land capability classification: IIe

OtC—Otwell silt loam, 6 to 12 percent slopes

Setting

Landform: River and stream valleys
Landscape position: Terraces
Size of areas: 5 to 35 acres
Major uses: Cropland, hayland, and pasture

Composition

Otwell soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have slopes of less than 6 percent or more than 12 percent
• Otwell soils that are in the lower landscape positions and are subject to rare flooding
• Soils having a darker or more loamy surface layer than that of the Otwell soil

Contrasting components:
• The well drained Elk soils that do not have a fragipan
• The poorly drained Melvin soils and the somewhat poorly drained Newark soils that are in the lower landscape positions, are subject to flooding, and do not have a fragipan

Typical Profile

Surface layer:
0 to 9 inches; dark grayish brown silt loam

Subsurface layer:
9 to 15 inches; yellowish brown and dark grayish brown silt loam

Subsoil:
15 to 29 inches; yellowish brown silt loam with brown redoximorphic features

29 to 65 inches; a fragipan of yellowish brown and dark yellowish brown, firm and brittle silt loam with gray and brown redoximorphic features

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Depth to the fragipan: 20 to 30 inches
Organic matter content: Low or moderately low
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: Depth—24 to 42 inches; kind—perched
Available water capacity: Moderate
Permeability: Very slow
Parent material: Old, mixed, local and nonlocal alluvium derived from limestone, siltstone, shale, and sandstone in the uplands; Quaternary System
Runoff: Moderately high
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Because of the fragipan, the crops selected for planting should be those that can tolerate wetness and have a moderately deep root system.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• The seasonal high water table can delay planting and harvesting.
• In places diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can tolerate both wetness and droughtiness, and have a moderately deep root system.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black gum, black oak, sugar maple, white oak, yellow-poplar
Some preferred trees for planting: Eastern white pine, white ash, white oak, yellow-poplar
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate both wetness and droughtiness and withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability of the subsoil on sites for campgrounds and playgrounds.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate both wet and dry conditions, have a moderately deep root system, and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

• Installing berms around ponds that are in the lower landscape positions helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Generally suited
Management considerations:
• The included soils in the lower landscape positions are not suited to building site development because of the flooding.
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing buildings and roads on well compacted fill material or properly designing foundations helps to overcome the low strength of the subsoil and prevent the damage caused by shrinking and swelling of the subsoil.
• Land shaping helps to overcome the slope.

Septic Tank Absorption Fields

Suitability: Generally poorly suited
Management considerations:
• The included soils in the lower landscape positions are not suited to septic tank absorption fields because of the flooding.
• Increasing the size of absorption fields helps to overcome the very slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the limited depth to the fragipan.
• Land shaping helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: IIIe

Pt—Pits, quarries

This miscellaneous land type occurs as open limestone quarries, excavated areas, and abandoned mining sites from which soil material and rock debris have been removed. The bottom of the quarries or excavated areas is 20 to more than 40 feet below the original surface. Areas range from 3 to 16 acres in size.

The land capability classification is VIIIs.

Se—Sees silt loam, 2 to 4 percent slopes, occasionally flooded

Setting

Landform: Stream valleys
Landscape position: Footslopes, toeslopes, and low terraces
Size of areas: 5 to 130 acres
Major uses: Cropland, hayland, and pasture

Composition

Sees soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have a thicker or thinner surface layer than that of the Sees soil
• Soils that have slopes of more than 4 percent
• Soils that have a higher gravel content than the Sees soil

Contrasting components:
• The well drained Woolper soils that have a mollic epipedon
• The somewhat poorly drained, fine-silty Newark soils that do not have a dark surface layer
• The poorly drained, fine-silty Melvin soils that do not a dark surface layer

Typical Profile

Surface layer:
0 to 15 inches; dark brown silt loam

Subsoil:
15 to 40 inches; dark grayish brown silty clay loam and silty clay with brown and gray redoximorphic features

Substratum:
40 to 62 inches; yellowish brown and dark grayish brown silty clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderate or high
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: Depth—18 to 24 inches; kind—perched
Available water capacity: High
Permeability: Slow
Parent material: Mixed, local alluvium and colluvium derived from limestone and calcareous shale of the Quaternary System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Moderate
Flooding: Occasional, brief periods during winter and spring
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Constructing berms or levees helps to protect from flooding.
• The crops selected for planting should be those that can tolerate wetness.
• Planting may need to be delayed because of the seasonal high water table and the flooding.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• Some hay crops can be damaged by flooding.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate wetness and flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: White oak, black walnut, yellow-poplar, shagbark hickory
Some preferred trees for planting: White oak, yellow-poplar, white ash, eastern white pine.
Management considerations:
• The equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Equipment should be operated only when the soil is dry.
• The seedling mortality rate can be high unless trees that can tolerate wetness and flooding are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate wetness and withstand heavy foot traffic and vehicular traffic.
• Recreational development should be restricted to picnic areas and paths and trails because of the seasonal high water table and the flooding.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate wetness and brief periods of flooding and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing buildings and roads on elevated, well compacted fill material helps to overcome the wetness, the flooding, and the low strength of the subsoil.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Building up or mounding sites for septic tank absorption fields with fill material and installing a drainage system around the absorption areas help to overcome the wetness and prevent inundation during periods of flooding.

Interpretive Groups

Land capability classification: IIw

ShC—Shelocta gravelly silt loam, 6 to 12 percent slopes

Setting

Landform: Uplands and stream valleys
Landscape position: Side slopes, footslopes, and benches
Size of areas: 5 to 150 acres
Major uses: Cropland, hayland, pasture, and woodland

Composition

Shelocta soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have a higher content of coarse fragments than the Shelocta soil
• Soils that have slopes of less than 6 percent or more than 12 percent
• Soils that have less sand or fewer coarse fragments in the control section than the Shelocta soil

Contrasting components:
• The loamy-skeletal Skidmore soils and the coarse-loamy Haymond soils on flood plains below the Shelocta soil
• The moderately well drained Blairton soils

Typical Profile

Surface layer:
0 to 6 inches; brown gravelly silt loam

Subsoil:
6 to 10 inches; yellowish brown gravelly silt loam

Substratum:
10 to 25 inches; yellowish brown silt loam and gravelly silt loam
25 to 52 inches; strong brown loam and very gravelly loam

Bedrock:
52 inches; soft, layered siltstone over sandstone

Soil Properties and Qualities

Depth class: Deep and very deep
Depth to bedrock: More than 40 inches
Organic matter content: Low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderate
Parent material: Mixed colluvium derived from shale, sandstone, and siltstone of the Mississippian System
Runoff: Medium or rapid
Tilth: Fair
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to control overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American beech, white oak, hickory, red maple
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, shortleaf pine, white ash
Management considerations:
• Plant competition is the main management concern.

• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
• Sites for playgrounds should be leveled and graded during construction.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Land shaping helps to overcome the slope, which is a moderate limitation affecting most building site development.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Land shaping helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.
• Increasing the size of septic tank absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.

Interpretive Groups

Land capability classification: IIIe

ShD—Shelocta gravelly silt loam, 12 to 20 percent slopes

Setting

Landform: Uplands and stream valleys
Landscape position: Side slopes, footslopes, and benches
Size of areas: 5 to 25 acres
Major uses: Hayland, pasture, and woodland

Composition

Shelocta soil and similar components: 60 to 80 percent
Contrasting components: 20 to 40 percent

Minor Components

Similar components:
• Soils that are moderately eroded
• Soils that have slopes of less than 12 percent or more than 20 percent
• Soils that have a higher content of coarse fragments than the Shelocta soil

Contrasting components:
• The loamy-skeletal Brownsville soils
• The moderately well drained, moderately deep Blairton soils

Typical Profile

Surface layer:
0 to 6 inches; brown gravelly silt loam

Subsoil:
6 to 10 inches; yellowish brown gravelly silt loam

Substratum:
10 to 25 inches; yellowish brown silt loam and gravelly silt loam
25 to 52 inches; strong brown loam and very gravelly loam

Bedrock:
52 inches; soft, layered siltstone over sandstone

Soil Properties and Qualities

Depth class: Deep and very deep
Depth to bedrock: More than 40 inches
Organic matter content: Low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderate

Parent material: Mixed colluvium derived from shale, sandstone, and siltstone of the Mississippian System
Runoff: Rapid
Tilth: Fair
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to prevent overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• In some areas of inclusions, slopes of more than 20 percent may restrict the use of some kinds of equipment.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American beech, white oak, hickory, red maple
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, shortleaf pine, white ash
Management considerations:
• The hazard of erosion, the equipment limitation, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Land shaping helps to overcome the slope.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Land shaping helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.
• Increasing the size of septic tank absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.

Interpretive Groups

Land capability classification: IVe

SkF2—Shelocta silt loam, 20 to 45 percent slopes, eroded

Setting

Landform: Uplands and stream valleys
Landscape position: Side slopes, footslopes, and benches
Size of areas: 5 to 195 acres
Major uses: Woodland

Composition

Shelocta soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that are not eroded or are slightly eroded or severely eroded
• Soils that have fewer coarse fragments or less sand in the control section than the Shelocta soil
• Soils that have a higher content of coarse fragments than the Shelocta soil

Contrasting components:
• The loamy-skeletal Brownsville soils
• The moderately well drained, moderately deep Blairton soils
• Areas of rubble in drains and draws

Typical Profile

Surface layer:
0 to 4 inches; brown silt loam

Subsoil:
4 to 8 inches; yellowish brown silt loam

Substratum:
8 to 23 inches; yellowish brown silt loam and gravelly silt loam
23 to 50 inches; strong brown loam and very gravelly loam

Bedrock:
50 inches; soft, layered siltstone over sandstone

Soil Properties and Qualities

Depth class: Deep and very deep
Depth to bedrock: More than 40 inches
Organic matter content: Low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderate
Parent material: Mixed colluvium derived from shale, sandstone, and siltstone of the Mississippian System
Runoff: Very rapid
Tilth: Fair
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Unsuited
Management considerations:
• This soil is unsuited to crops because of the slope, the rock fragments, and the very severe hazard of erosion.

Hayland and Pasture

Suitability: Hayland—unsuited; pasture—poorly suited
Management considerations:
• The very steep slopes limit the use of farm machinery.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• This map unit should be restricted to use as woodland in areas where slopes are more than 30 percent.

Woodland

Suitability: Suited
Some common trees: American beech, white oak, hickory, red maple, yellow-poplar
Some preferred trees for planting: Eastern white pine, northern red oak, shortleaf pine, white ash
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope.

- The seedling mortality rate can be high on warm slopes because of the drier conditions.
- On warm slopes the planting of trees should be timed to take maximum advantage of rainfall and to avoid dry periods.
- Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
- See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
- The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
- Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.
- Recreational development should be restricted to paths and trails.

Wildlife Habitat

Suitability: Suited
Management considerations:
- The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
- If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Unsuited
Management considerations:
- This soil is unsuited to building site development because of the slope, which is difficult to overcome.

Septic Tank Absorption Fields

Suitability: Unsuited

Interpretive Groups

Land capability classification: VIIe

SmB—Shelocta-Skidmore complex, 2 to 6 percent slopes

Setting

Landform: Uplands and stream valleys
Landscape position: Footslopes, benches, and flood plains
Slope: Shelocta—2 to 6 percent; Skidmore—2 to 4 percent
Size of areas: 5 to 75 acres
Major uses: Cropland, hayland, pasture, and woodland

Composition

Shelocta soil and similar components: 40 to 50 percent
Skidmore soil and similar components: 30 to 40 percent
Contrasting components: 10 to 30 percent

Minor Components

Similar components:
- Soils that have a lower or a higher content of coarse fragments than the Shelocta soil
- Soils having steeper slopes than those of the Shelocta soil
- The Skidmore soils that are subject to frequent, brief periods of flooding
- Soils that are not so well drained as the Skidmore soil

Contrasting components:
- Soils that have less sand and fewer rock fragments throughout the profile than the Skidmore soil
- The coarse-silty Haymond soils

Typical Profile

Shelocta

Surface layer:
0 to 6 inches; brown gravelly silt loam

Subsurface layer:
6 to 10 inches; yellowish brown gravelly silt loam

Subsoil:
10 to 25 inches; yellowish brown silt loam and gravelly silt loam
25 to 52 inches; strong brown loam and very gravelly loam

Bedrock:
52 inches; soft, layered siltstone over sandstone

Skidmore

Surface layer:
0 to 6 inches; dark yellowish brown gravelly silt loam

Subsoil:
6 to 38 inches; dark yellowish brown very gravelly and extremely gravelly loam

Substratum:
38 to 72 inches; yellowish brown extremely gravelly loam

Soil Properties and Qualities

Shelocta

Depth class: Deep and very deep
Depth to bedrock: More than 40 inches
Organic matter content: Low to high
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderate
Parent material: Mixed colluvium derived from shale, sandstone, and siltstone of the Mississippian System
Runoff: Medium
Tilth: Fair
Shrink-swell potential: Low
Hazard of erosion: Moderate

Skidmore

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Low or moderately low
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of 36 to 48 inches
Available water capacity: Low
Permeability: Moderately rapid
Parent material: Mixed, local alluvium derived from sandstone, siltstone, and shale of the Quaternary System
Runoff: Medium
Tilth: Fair
Shrink-swell potential: Low
Flooding: Occasional, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The flooding may damage some hay plants in areas of the Skidmore soil.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American beech, white oak, black gum, sweetgum, black oak, yellow-poplar
Some preferred trees for planting: Black walnut, eastern white pine, American sycamore, white ash, white oak, yellow-poplar
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Shelocta—suited; Skidmore—poorly suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and heavy foot traffic and vehicular traffic.
• The Skidmore soil is severely limited as a site for campgrounds and playgrounds because of the flooding.
• Recreational development in areas of the Skidmore soil should be restricted to picnic grounds, paths and trails, and other noncamping uses.

Wildlife Habitat

Suitability: Well suited

Management considerations:
- The plants selected for food plots, forage, or cover should be those that can tolerate occasional, brief periods of flooding and meet the needs of the wildlife species for which they are managed.
- If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
- Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
- Installing berms around ponds in areas of the Skidmore soil helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Shelocta—suited; Skidmore—unsuited
Management considerations:
- In areas of the Shelocta soil, land shaping on sites for small commercial buildings helps to overcome the slope, which is a moderate limitation.
- The Skidmore soil is unsuited to building site development because of the flooding.

Septic Tank Absorption Fields

Suitability: Shelocta—suited; Skidmore—unsuited
Management considerations:
- In areas of the Shelocta soil, increasing the size of absorption fields and adding fill material help to overcome the moderate permeability of the subsoil.
- The Skidmore soil is unsuited to septic tank absorption fields because of the flooding.

Interpretive Groups

Land capability classification: Shelocta—IIe; Skidmore—IIIs

SrB—Shrouts silty clay loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops
Size of areas: 5 to 15 acres
Major uses: Cropland, hayland, and pasture

Composition

Shrouts soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
- Soils that have slopes of more than 6 percent
- Soils that are moderately eroded

Contrasting components:
- The moderately well drained Aaron soils

Typical Profile

Surface layer:
0 to 6 inches; dark grayish brown silty clay loam

Subsoil:
6 to 23 inches; light olive brown, mottled silty clay and clay

Substratum:
23 to 33 inches; light olive gray silty clay

Bedrock:
33 to 40 inches; soft, light olive gray shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Low to moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Very slow
Parent material: Clayey residuum derived from calcareous shale interbedded with thin dolomite of the Upper Crab Orchard Formation of the Silurian System
Runoff: Medium
Tilth: Fair
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
- Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
- Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Suited
Management considerations:
- The species selected for planting should be those that provide high-quality forage and satisfactory

ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Suited
Some common trees: Black oak, eastern redcedar, scarlet oak, Virginia pine, white oak
Some preferred trees for planting: White oak
Management considerations:
• The equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• The high content of clay in the upper 10 inches of the solum restricts the use of equipment to periods when the soil is dry.
• Because the soil is only moderately deep and has a low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can tolerate slightly droughty conditions, have a moderately deep root system, and can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding fill material to the basin and berm during construction of ponds for water or fish management helps to increase the water-holding capacity and overcome the limited depth to bedrock.

Building Site Development

Suitability: Suited
Management considerations:
• Properly designing foundations helps to overcome the moderate depth to bedrock and prevent the structural damage caused by shrinking and swelling.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the slow permeability of the subsoil and the moderate depth to bedrock.

Interpretive Groups

Land capability classification: IIe

SrD3—Shrouts silty clay loam, 12 to 30 percent slopes, severely eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to several hundred acres
Major uses: Woodland, pasture, and hayland

Composition

Shrouts soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that are not so eroded as the Shrouts soil
• Soils that are redder in the upper part of the solum
• Soils that are less than 20 inches or more than 40 inches deep to bedrock

Contrasting components:
• Beasley soils that are deeper to bedrock
• Areas where extreme erosion has removed nearly all soil material above bedrock and left numerous gullies

Typical Profile

Surface layer:
0 to 2 inches; dark grayish brown silty clay loam

Subsoil:
2 to 19 inches; light olive brown, mottled silty clay and clay

Substratum:
19 to 29 inches; light olive gray silty clay

Bedrock:
29 to 39 inches; soft, light olive gray shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Low to moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Very slow
Parent material: Clayey residuum derived from calcareous shale interbedded with dolomite of the Lower and Upper Crab Orchard Formation; Silurian System
Runoff: Very rapid
Tilth: Fair
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• If slopes are more than 20 percent, the use of farm machinery is limited and the soil should be restricted to use as pasture or woodland.

Hayland and Pasture

Suitability: Hayland—poorly suited; pasture—suited
Management considerations:
• Because of the clayey nature of this soil, pastures are subject to hoof damage if they are grazed when the soil is wet.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Suited
Some common trees: Black oak, eastern redcedar, scarlet oak, Virginia pine, white oak
Some preferred trees for planting: White oak
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• The high content of clay in the upper 10 inches of the solum restricts the use of equipment to periods when the soil is dry.
• Because the soil is only moderately deep and has a low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can tolerate slightly droughty conditions, have a moderately deep root system, and can withstand heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited

Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding fill material to the basin and berm during construction of ponds for water or fish management helps to increase the water-holding capacity and overcome the limited depth to bedrock.

Building Site Development

Suitability: Poorly suited
Management considerations:
• Properly designing foundations helps to overcome the moderate depth to bedrock and prevent the structural damage caused by shrinking and swelling.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.
• Land grading and land shaping help to overcome the slope.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The slope, the depth to bedrock, and the very slow permeability are the major management concerns.
• The limitations are difficult to overcome.

Interpretive Groups

Land capability classification: VIIe

SsC2—Shrouts-Beasley complex, 6 to 12 percent slopes, eroded

Setting

Landform: Uplands
Landscape position: Side slopes
Size of areas: 5 to 170 acres
Major uses: Pasture and woodland

Composition

Shrouts soil and similar components: 50 to 55 percent
Beasley soil and similar components: 30 to 35 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are not eroded or are slightly eroded or severely eroded
• Soils that are redder in the upper part of the solum than the Shrouts soil

Contrasting components:
• Areas of dolomite rock outcrop
• Soils that are less than 20 inches deep to bedrock
• Soils that are deeper to bedrock than the Beasley soil

Typical Profile

Shrouts

Surface layer:
0 to 3 inches; dark grayish brown silty clay loam

Subsoil:
3 to 20 inches; light olive brown, mottled silty clay and clay

Substratum:
20 to 30 inches; light olive gray silty clay

Bedrock:
30 to 40 inches; soft, light olive gray shale

Beasley

Surface layer:
0 to 5 inches; yellowish brown silt loam

Subsoil:
5 to 30 inches; yellowish brown silty clay loam, silty clay, and clay

Substratum:
30 to 42 inches; yellowish brown and light olive brown clay

Bedrock:
42 to 53 inches; soft, greenish gray and yellowish brown, layered shale mixed with or overlying hard, brown, coarse grained dolomite

Soil Properties and Qualities

Shrouts

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Low to moderate
Natural fertility: Low
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Low
Permeability: Very slow
Parent material: Clayey residuum derived from calcareous shale interbedded with dolomite of the Upper Crab Orchard Formation; Silurian System
Runoff: Medium or rapid
Tilth: Fair

Shrink-swell potential: Moderate
Hazard of erosion: Severe

Beasley

Depth class: Deep
Depth to bedrock: 40 to 60 inches
Organic matter content: Low to moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Moderately slow
Parent material: Clayey residuum derived from olive, calcareous shales and brown dolomite of the Upper Crab Orchard Formation of the Silurian System and brown dolomite and calcareous shale of the Preachersville Member of the Drakes Formation of the Ordovician System
Runoff: Medium or rapid
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Hayland—poorly suited; pasture—suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can withstand droughtiness, and need minimum renovation.
• Controlling undesirable woody vegetation by cutting or by applying herbicides helps to maintain the quality of pastures.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Suited
Some common trees: Black locust, black oak, chinkapin oak, eastern redcedar
Some preferred trees for planting: White ash, white oak, hickory
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• The high content of clay in the upper 10 inches of the solum restricts the use of equipment to periods when the soil is dry.
• Because the Shrouts soil is only moderately deep and has a low available water capacity, tree planting should be timed to take maximum advantage of rainfall and to avoid dry periods.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and moderate foot traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding fill material to the basin and berm during construction of ponds for water or fish management helps to increase the water-holding capacity and overcome the limited depth to bedrock.

Building Site Development

Suitability: Suited

Management considerations:
• The construction of buildings should be limited to those with properly designed foundations and no basements.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.
• Land grading and land shaping help to overcome the slope.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of the absorption fields and adding fill material help to overcome the slow permeability of the subsoil and the moderate depth to bedrock.
• Installing septic tank absorption fields on the contour or land grading helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: IVe

Sx—Skidmore gravelly silt loam, occasionally flooded

Setting

Landform: Stream valleys
Landscape position: Flood plains
Slope: 0 to 4 percent
Size of areas: 5 to 220 acres
Major uses: Cropland, hayland, pasture, and woodland

Composition

Skidmore soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that are more acid and have fewer coarse fragments throughout than the Skidmore soil
• Soils that are loamy in the upper part of the solum and gravelly in the lower part

Contrasting components:
• The fine-loamy Shelocta soils that have an argillic horizon
• The fine-silty, somewhat poorly drained Newark soils
• The coarse-silty Haymond soils

Typical Profile

Surface layer:
0 to 6 inches; dark yellowish brown gravelly silt loam

Subsoil:
6 to 38 inches; dark yellowish brown very gravelly and extremely gravelly loam

Substratum:
38 to 72 inches; yellowish brown extremely gravelly loam

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Low or moderately low
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: Depth—36 to 48 inches; kind—apparent
Available water capacity: Low
Permeability: Moderately rapid
Parent material: Mixed, local alluvium derived from sandstone, siltstone, and shale of the Quaternary System
Runoff: Slow
Tilth: Fair
Shrink-swell potential: Low
Flooding: Occasional, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• Installing berms or levees helps to control the flooding.
• Diversions can help to control runoff and overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• Some hay plants may be damaged by the occasional flooding.

• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: American sycamore, white oak, black gum, black oak, river birch, sweetgum, yellow-poplar
Some preferred trees for planting: American sycamore, eastern white pine, sweetgum, white ash, white oak
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and heavy foot traffic and vehicular traffic.
• This soil is limited as a site for campgrounds and playgrounds because of the flooding.
• Recreational development should be restricted to picnic areas, paths and trails, and other noncamping uses.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season; tolerate occasional, very brief periods of flooding; and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.
• Installing berms around these ponds helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Unsuited
Management considerations:
• This soil is unsuited to building site development because of the flooding.

Septic Tank Absorption Fields

Suitability: Unsuited
Management considerations:
• The flooding, seepage, and the small stones are the major management concerns.
• The limitations are difficult to overcome.

Interpretive Groups

Land capability classification: IIIs

TsB—Tilsit silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops
Size of areas: 5 to 175 acres
Major uses: Cropland, hayland, and pasture

Composition

Tilsit soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils that are very poorly drained
• Soils that have a weak, poorly identifiable fragipan
• Soils that have slopes of more than 6 percent

Contrasting components:
• The moderately deep Blairton soils that do not have a fragipan

Typical Profile

Surface layer:
0 to 9 inches; brown, mottled silt loam

Subsoil:
9 to 16 inches; yellowish brown silt loam

16 to 23 inches; light olive brown silt loam with brown and gray redoximorphic features
23 to 43 inches; a fragipan of yellowish brown and light brownish gray, firm and brittle silty clay loam with gray and brown redoximorphic features

Bedrock:
43 inches; hard sandstone

Soil Properties and Qualities

Depth class: Deep and very deep
Depth to bedrock: More than 40 inches
Depth to the fragipan: 18 to 28 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: Depth—18 to 30 inches; kind—perched
Available water capacity: Moderate
Permeability: Moderate above the fragipan; slow in and below the fragipan.
Parent material: Silty residuum derived from siltstone, fine grained sandstone, or shale of the Nancy Member of the Borden Formation; Mississippian System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Because of the seasonal high water table and the fragipan, the crops selected for planting should be those that can tolerate wetness and have a moderately deep root system.
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can tolerate both wetness and droughtiness, and have a moderately deep root system.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with well placed salt and watering facilities to aid in the distribution of grazing.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, hickory, red maple, scarlet oak, white oak, large-tooth aspen
Some preferred trees for planting: Eastern white pine, shortleaf pine, white oak, yellow-poplar
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can tolerate both wet and dry conditions, have a moderately deep root system, and can withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability of the subsoil on sites for campgrounds and playgrounds.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate both wet and dry conditions, have a moderately deep root system, and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields helps to overcome the slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the limited depth to the fragipan.

Interpretive Groups

Land capability classification: IIe

TsC—Tilsit silt loam, 6 to 12 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops and side slopes
Size of areas: 5 to 35 acres
Major uses: Cropland, hayland, and pasture

Composition

Tilsit soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have a weak, poorly identifiable fragipan
• Soils that have slopes of less than 6 percent

Contrasting components:
• The moderately deep Blairton soils that do not have a fragipan

Typical Profile

Surface layer:
0 to 9 inches; brown, mottled silt loam

Subsoil:
9 to 16 inches; yellowish brown silt loam
16 to 23 inches; light olive brown silt loam with brown and gray redoximorphic features
23 to 43 inches; a fragipan of yellowish brown and light brownish gray, firm and brittle silty clay loam with gray and brown redoximorphic features

Bedrock:
43 inches; hard sandstone

Soil Properties and Qualities

Depth class: Deep and very deep
Depth to bedrock: More than 40 inches
Depth to the fragipan: 18 to 28 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Moderately well drained
Seasonal high water table: Depth—18 to 30 inches; kind—perched
Available water capacity: Moderate
Permeability: Moderate above the fragipan; slow in and below the fragipan.
Parent material: Silty residuum derived from siltstone, fine grained sandstone, or shale of the Nancy Member of the Borden Formation; Mississippian System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Because of the seasonal high water table and the fragipan, the crops selected for planting should be those that can tolerate wetness and have a moderately deep root system.
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover, can tolerate both wetness and droughtiness, and have a moderately deep root system.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along

with well placed salt and watering facilities to aid in the distribution of grazing.
• A well planned mowing and harvesting schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, hickory, red maple, scarlet oak, white oak, large-toothed aspen
Some preferred trees for planting: Eastern white pine, shortleaf pine, white oak, yellow-poplar
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can tolerate both wet and dry conditions, have a moderately deep root system, and can withstand heavy foot traffic and vehicular traffic.
• Installation of a drainage system helps to overcome the seasonal high water table and the slow permeability of the subsoil on sites for campgrounds and playgrounds.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can tolerate both wet and dry conditions, have a moderately deep root system, and can meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Suited
Management considerations:
• Installing a drainage system along the foundation of buildings helps to overcome the wetness.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.
• Land shaping helps to overcome the slope.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields helps to overcome the slow permeability of the subsoil.
• Building up or mounding sites for septic tank absorption fields with fill material helps to overcome the wetness and the limited depth to the fragipan.
• Land shaping helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: IIIe

TtB—Trappist silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Landscape position: Ridgetops
Size of areas: 5 to 10 acres
Major uses: Cropland, hayland, and pasture

Composition

Trappist soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have slopes of more than 6 percent

Contrasting components:
• The moderately well drained, fine-silty Nicholson soils that have a fragipan.
• The clayey-skeletal, shallow Colyer soils

Typical Profile

Surface layer:
0 to 6 inches; brown silt loam

Subsoil:
6 to 11 inches; yellowish brown silty clay loam
11 to 24 inches; yellowish brown, mottled very channery clay

Substratum:
24 to 34 inches; yellowish brown, mottled very channery clay

Bedrock:
34 inches; hard, layered, black, fissile shale

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: Moderate
Permeability: Slow
Parent material: Clayey residuum derived from black, fissile shales of the Ohio Shale Formation of the Devonian System and of the Sunbury Formation of the Mississippian System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth and to maintain the organic matter content.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.
• In places diversions can help to control overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Suited
Management considerations:
• Because of the clayey nature of this soil, pastures are subject to hoof damage if they are grazed when the soil is wet.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, red maple, hickory, northern red oak, red maple, white oak
Some preferred trees for planting: Northern red oak, white oak
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand slightly droughty conditions and heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that can withstand slightly droughty conditions during the growing season and meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding fill material to the basin and berm during construction of ponds for water or fish management helps to increase the water-holding capacity and overcome the limited depth to bedrock.

Building Site Development

Suitability: Suited
Management considerations:
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling.
• Constructing roads on well compacted fill material helps to overcome the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Poorly suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to overcome the slow

permeability of the subsoil and the moderate depth to bedrock.

Interpretive Groups

Land capability classification: IIe

Ud—Udorthents, smoothed

These shallow to very deep, nearly level to very steep, somewhat poorly drained to well drained soils are a mixture of fine-earth material and rock fragments excavated during highway construction and placed in valleys or hollows near the highway cuts where they were removed. They are mainly along Kentucky 9, known locally as the AA-Highway. Slopes range from 0 to 12 percent on the graded and smoothed tops and from 12 to 70 percent on the side slopes. Mapped areas are irregular in shape and range from 5 to 90 acres in size.

In Lewis County, the physical composition, as well as the mineralogical and chemical properties, of the Udorthents is dependent upon the geologic strata at the location from which the material was initially removed. See "Physiography and Geology" in the section "Formation of the Soils" and table 21 for more information about the geology of the county.

Udorthents vary greatly; therefore, a typical pedon is not given. Natural fertility is low. Permeability varies widely because of the nature of the material, and available water capacity is low. Udorthents generally have bedrock at depths ranging from 5 to 50 or more feet. Rock fragments that range in size from gravel to boulders weighing several tons make up 10 to 90 percent of the mixture. In the western part of the county, the rock fragments are mostly limestone, dolomite, and calcareous shale, while in the central and eastern parts of the county, they are mostly sandstone, siltstone, and acid shales, all of which are randomly oriented. The percentage of fragments varies greatly with depth. In many areas these fragments bridge voids as a result of placement. This leaves discontinuous, irregular pores that are larger than texture porosity. Such voids are variable in size, frequency, and prominence.

The fine-earth texture of this material varies greatly and is dependent upon the parent material. The clay content ranges from a high of 60 to 80 percent in areas of calcareous shale to a low of 5 to 18 percent in areas of sandstone and siltstone. The sand content is also restricted by parent material, ranging from 10 to 20 percent in areas of calcareous shale and from 30 to more than 50 percent in areas of sandstone and siltstone. Reaction is extremely acid to moderately alkaline.

The color range depends upon the parent rock and soil material. The hue generally is 5YR to 5Y. Mottling generally occurs without regard to depth or spacing of the material.

Most of the acreage in this map unit is idle land, with some areas used as borrow areas for roadfill, dumping sites, or timber loading areas. This map unit is generally unsuited to agricultural and urban uses.

Onsite investigation is necessary to determine the limitations and suitability for a proposed use. Extensive reinforcement of concrete is recommended in areas of Udorthents because settling over time will crack footers and foundation walls. Erosion is a hazard, and a permanent vegetative cover is needed in areas of this map unit. The species of plants and trees selected for planting should be those that are suited to the chemical and physical properties of the individual areas in the map unit.

The land capability classification is VIIe.

W—Water

This map unit occurs as open areas of water that is deep enough to prohibit the growth of land plants. Ponds, lakes, perennial streams, and the Ohio River are examples of these areas.

WeB—Wheeling loam, 2 to 6 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Terraces
Size of areas: 5 to 330 acres
Major uses: Cropland, hayland, and pasture

Composition

Wheeling soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
- Soils having a darker or more silty surface layer than that of the Wheeling soil
- Soils that have less sand in the subsoil than the Wheeling soil

Contrasting components:
- The fine-silty Nolin soils that are subject to occasional flooding and in the lower landscape positions on flood plains
- The coarse-loamy Chavies soils

• The moderately well drained, fine-silty Otwell soils that have a fragipan

Typical Profile

Surface layer:
0 to 9 inches; dark yellowish brown loam

Subsoil:
9 to 27 inches; dark yellowish brown loam and sandy clay loam
27 to 64 inches; brown, dark yellowish brown, and yellowish brown fine sandy loam and loamy fine sand
64 to 69 inches; dark yellowish brown fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Mixed, nonlocal alluvium deposited by the Ohio River; Quaternary System
Runoff: Medium
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Northern red oak, yellow-poplar, silver maple
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, shortleaf pine, white ash
Management considerations:
• Plant competition is the main management concern.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Well suited
Management considerations:
• The contrasting soils that are in the lower landscape positions and are subject to flooding are not suited to camp areas or playgrounds and should be restricted to other uses.
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish

management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Well suited
Management considerations:
• Land shaping on sites for small commercial buildings helps to overcome the slope, which is a moderate limitation.
• The contrasting soils that are in the lower landscape positions and are subject to flooding are not suited to building site development.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to improve the ability of the soil to absorb and filter effluent.
• Constructing absorption fields in a mound of suitable fill material helps to prevent inundation during periods of flooding in areas of the included contrasting soils in the lower landscape positions.

Interpretive Groups

Land capability classification: IIe

WeC—Wheeling loam, 6 to 12 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Terraces
Size of areas: 5 to 65 acres
Major uses: Cropland, hayland, and pasture

Composition

Wheeling soil and similar components: 70 to 80 percent
Contrasting components: 20 to 30 percent

Minor Components

Similar components:
• Soils that have slopes of more than 12 percent
• Soils having a darker or more silty surface layer than that of the Wheeling soil
• Soils that have less sand in the subsoil than the Wheeling soil

Contrasting components:
• The fine-silty, somewhat poorly drained Newark soils that are subject to occasional flooding and in the lower landscape positions
• The excessively drained Lakin soils that have more sand throughout than the Wheeling soil
• The fine-silty Nolin soils that are subject to occasional flooding and in the lower landscape positions

Typical Profile

Surface layer:
0 to 9 inches; dark yellowish brown loam

Subsoil:
9 to 27 inches; dark yellowish brown loam and sandy clay loam
27 to 64 inches; brown, dark yellowish brown, and yellowish brown fine sandy loam and loamy fine sand
64 to 69 inches; dark yellowish brown fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low or moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Mixed, nonlocal alluvium deposited by the Ohio River; Quaternary System
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• In places diversions can help to control runoff and overwash from adjacent upland side slopes.

Hayland and Pasture

Suitability: Well suited

Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Northern red oak, yellow-poplar, pin oak, silver maple
Some preferred trees for planting: Black walnut, eastern white pine, northern red oak, shortleaf pine, white ash
Management considerations:
• The hazard of erosion and plant competition are the main management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Generally suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Playgrounds should be restricted to areas of similar included soils having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.
• The contrasting soils that are in the lower landscape positions and are subject to flooding are not suited to camp areas or playgrounds and should be restricted to other uses.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Generally well suited
Management considerations:
• The contrasting soils that are in the lower landscape positions and are subject to flooding are not suited to building site development.
• Land shaping helps to overcome the slope on some building sites.

Septic Tank Absorption Fields

Suitability: Suited
Management considerations:
• Increasing the size of absorption fields and adding fill material help to improve the ability of the soil to absorb and filter effluent.
• Constructing absorption fields in a mound of suitable fill material helps to prevent inundation during periods of flooding in areas of the included contrasting soils in the lower landscape positions.
• Land shaping helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: IIIe

WnD—Wheeling-Nolin complex, 2 to 30 percent slopes

Setting

Landform: Ohio River valley
Landscape position: Wheeling—terraces; Nolin—flood plains
Slope: Wheeling—2 to 30 percent; Nolin—2 to 3 percent
Size of areas: 5 to 315 acres
Major uses: Woodland and unimproved pasture

Composition

Wheeling soil and similar components: 40 to 50 percent

Nolin soil and similar components: 30 to 40 percent
Contrasting components: 10 to 30 percent

Minor Components

Similar components:
• Soils that have a darker, more silty surface layer than that of the Wheeling soil
• Soils that have a layer of gravel in the subsoil or a higher content of gravel than the Wheeling soil
• Soils that have a darker surface layer or more sand in the subsoil than the Nolin soil
• Soils that have a weakly expressed argillic horizon

Contrasting components:
• The Lakin soils that have more sand throughout than the Wheeling and Nolin soils
• The coarse-loamy Chavies soils

Typical Profile

Wheeling

Surface layer:
0 to 9 inches; dark yellowish brown loam

Subsoil:
9 to 27 inches; dark yellowish brown loam and sandy clay loam
27 to 64 inches; brown, dark yellowish brown, and yellowish brown fine sandy loam and loamy fine sand
64 to 69 inches; dark yellowish brown fine sandy loam

Nolin

Surface layer:
0 to 7 inches; dark grayish brown silt loam

Subsoil:
7 to 60 inches; dark grayish brown silt loam

Substratum:
60 to 65 inches; brown silt loam

Soil Properties and Qualities

Wheeling

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderate
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Mixed, nonlocal alluvium deposited by the Ohio River; Quaternary System
Runoff: Very rapid
Tilth: Good
Shrink-swell potential: Low
Hazard of erosion: Severe

Nolin

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: Moderately low or moderate
Natural fertility: High
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderate
Parent material: Loamy, nonlocal alluvium derived from limestone, siltstone, and shale of the Quaternary System
Runoff: Very slow
Tilth: Good
Shrink-swell potential: Low
Flooding: Frequent, brief periods during winter and spring
Hazard of erosion: None or slight

Use and Management

Cropland

Suitability: Generally unsuited
Management considerations:
• The Nolin soil is poorly suited to crops if it is cultivated only occasionally.
• In areas where slope is less than 20 percent, the Wheeling soil is poorly suited to crops if it is cultivated only occasionally.
• Terracing, contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to reduce the runoff rate and control erosion in areas of the Wheeling soil.
• Installing berms or levees in areas of the Nolin soil helps to control flooding.
• Keeping a permanent cover of vegetation on streambanks and in drainageways helps to prevent excessive erosion.
• Diversions can help to control runoff and overwash from adjacent, higher terraces or upland side slopes.

Hayland and Pasture

Suitability: Generally suited
Management considerations:
• If the slope is more than 20 percent, these soils are unsuited to hay because of an equipment limitation.

• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, northern red oak, white oak, eastern cottonwood, yellow-poplar, American sycamore, river birch
Some preferred trees for planting: Black walnut, shortleaf pine, white oak, white ash, sweetgum, eastern white pine
Management considerations:
• The hazard of erosion, the equipment limitation, the seedling mortality rate, and plant competition are the major management concerns.
• Installing water bars and culverts, applying gravel to the road surface or trail, maintaining a cover of grasses, and building roads on the contour and at a grade of 10 percent or less help to control erosion on permanent roads and trails in areas of the Wheeling soil, which has slopes of as much as 30 percent.
• Using tracked or specialized machinery helps to overcome the equipment limitation caused by the slope in areas of the Wheeling soil.
• The seedling mortality rate in areas of the Nolin soil can be high unless trees that can tolerate the flooding are selected for planting.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• Because the surface layer of the soil is loose, it should be disturbed as little as possible.
• See table 7 for additional information on woodland.

Recreation

Suitability: Poorly suited
Management considerations:
• Recreational development in areas of the Nolin soil should be restricted to paths and trails because of the flooding.
• The areas of the Nolin soil subject to flooding can be used for esthetic purposes or as wildlife habitat.
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Adding liners, clay, or other well compacted fill material during construction of ponds for water or fish management reduces the amount of water lost to piping and seepage.

Building Site Development

Suitability: Wheeling—poorly suited; Nolin—unsuited
Management considerations:
• The Nolin soil is unsuited to building site development because of the flooding.
• Land grading and land shaping help to overcome the slope.

Septic Tank Absorption Fields

Suitability: Wheeling—poorly suited; Nolin—unsuited
Management considerations:
• The Nolin soil is unsuited to septic tank absorption fields because of the flooding.
• Land shaping in areas of the Wheeling soil helps to overcome the slope and improve the ability of the soil to absorb and filter effluent.

Interpretive Groups

Land capability classification: Wheeling—VIe; Nolin—IIw

WoB—Woolper silty clay loam, 2 to 6 percent slopes, rarely flooded

Setting

Landform: Uplands and stream valleys
Landscape position: Footslopes and fans
Size of areas: 5 to 160 acres
Major uses: Cropland, hayland, and pasture (fig. 12)

Composition

Woolper soil and similar components: 70 to 80 percent

Figure 12.—Corn and hay in an area of Woolper silty clay loam, 2 to 6 percent slopes, rarely flooded.

Contrasting components: 20 to 30 percent

Minor Components

Similar components:
- Soils having a surface layer that is not so dark as that of the Woolper soil
- Somewhat poorly drained or poorly drained soils in the lower landscape positions
- Soils that have a higher content of coarse fragments than the Woolper soil

Contrasting components:
- The moderately well drained Sees soils
- The moderately deep, fine-loamy Boonesboro soils

Typical Profile

Surface layer:
0 to 10 inches; very dark grayish brown silty clay loam

Subsoil:
10 to 23 inches; dark brown and dark yellowish brown silty clay loam
23 to 45 inches; dark yellowish brown channery silty clay and very channery clay

Substratum:
45 to 62 inches; olive brown, mottled channery clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: High
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High

Permeability: Moderately slow to moderately rapid
Parent material: Clayey alluvium and colluvium derived from calcareous shale, dolomite, and limestone of the Silurian and Ordovician Systems
Runoff: Medium
Tilth: Good
Shrink-swell potential: Moderate
Flooding: Rare, brief periods during winter and spring
Hazard of erosion: Moderate

Use and Management

Cropland

Suitability: Generally well suited
Management considerations:
• Although the soil is generally well suited to cropland, flooding damages some crops.
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, maintain fertility, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The flooding may damage some hay crops.
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, black walnut, chinkapin oak, hickory, sugar maple, white ash
Some preferred trees for planting: Eastern white pine, northern red oak, white ash, white oak, yellow-poplar
Management considerations:
• The equipment limitation and plant competition are the main management concerns.
• The high content of clay in the upper 10 inches of the solum restricts the use of equipment to periods when the soil is dry.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Recreational development in areas of the included soils that are subject to more frequent periods of flooding should be restricted to picnic grounds and paths and trails.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.
• Installing berms around ponds for water or fish management helps to prevent inundation during periods of flooding.

Building Site Development

Suitability: Generally suited
Management considerations:
• Although this soil generally is suited to building site development, it is not suited to development in areas that are subject to flooding.
• Properly designing foundations helps to prevent the structural damage caused by shrinking and swelling.
• Constructing buildings and roads on well compacted fill material helps to overcome the flooding and the low strength of the subsoil and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Generally suited

Management considerations:
• Although this soil generally is suited to septic tank absorption fields, it is not suited to absorption fields in areas that are subject to flooding.
• Increasing the size of absorption fields and adding fill material help to overcome the moderately slow or slow permeability of the subsoil.

Interpretive Groups

Land capability classification: IIe

WoC—Woolper silty clay loam, 6 to 12 percent slopes

Setting

Landform: Uplands and stream valleys
Landscape position: Footslopes and fans
Size of areas: 5 to 30 acres
Major uses: Cropland, hayland, and pasture

Composition

Woolper soil and similar components: 80 to 90 percent
Contrasting components: 10 to 20 percent

Minor Components

Similar components:
• Soils having a surface layer that is not so dark as that of the Woolper soil
• Soils that have slopes of more than 12 percent
• Soils that have more clay in the surface layer than the Woolper soil

Contrasting components:
• The moderately well drained Sees soils

Typical Profile

Surface layer:
0 to 10 inches; very dark grayish brown silty clay loam

Subsoil:
10 to 23 inches; dark brown and dark yellowish brown silty clay loam
23 to 45 inches; dark yellowish brown channery silty clay and very channery clay

Substratum:
45 to 62 inches; olive brown, mottled channery clay

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 60 inches
Organic matter content: High
Natural fertility: Medium
Drainage class: Well drained
Seasonal high water table: At a depth of more than 72 inches
Available water capacity: High
Permeability: Moderately slow to moderately rapid
Parent material: Clayey alluvium and colluvium derived from calcareous shale, dolomite, and limestone of the Silurian and Ordovician Systems
Runoff: Rapid
Tilth: Good
Shrink-swell potential: Moderate
Hazard of erosion: Severe

Use and Management

Cropland

Suitability: Suited
Management considerations:
• Contour farming, stripcropping, applying a conservation tillage system, planting cover crops, including grasses and legumes in the cropping sequence, and returning crop residue to the soil help to improve and maintain soil tilth, maintain the organic matter content, improve soil fertility, reduce the runoff rate, and control erosion.
• Keeping a permanent cover of vegetation in drainageways helps to prevent excessive erosion.

Hayland and Pasture

Suitability: Well suited
Management considerations:
• The species selected for planting should be those that provide high-quality forage and satisfactory ground cover and can tolerate flooding.
• Pasture renovation should be frequent enough to maintain the desired species.
• A good grazing system should include proper stocking rates and a rotation grazing system, along with properly located fences, salt, and watering facilities to aid in the distribution of grazing.
• Where practical, building fences along streams to restrict livestock access helps to control streambank erosion.
• A well planned harvesting and mowing schedule should be established.

Woodland

Suitability: Well suited
Some common trees: Black oak, black walnut, chinkapin oak, hickory, sugar maple, white ash
Some preferred trees for planting: Eastern white pine, northern red oak, white ash, white oak, yellow-poplar
Management considerations:
• The equipment limitation and plant competition are the main management concerns.

• The high content of clay in the upper 10 inches of the solum restricts the use of equipment to periods when the soil is dry.
• Weeds and undesirable grasses and shrubs that compete with trees for moisture and nutrients can be controlled by cutting or by applying the appropriate herbicides in a timely manner.
• See table 7 for additional information on woodland.

Recreation

Suitability: Suited
Management considerations:
• The species selected for planting should be those that can withstand heavy foot traffic and vehicular traffic.
• Playgrounds should be restricted to areas of similar included soils having slopes of less than 6 percent, or the sites for playgrounds should be leveled during construction.
• Establishing water bars on paths and trails helps to reduce the runoff rate and control erosion.

Wildlife Habitat

Suitability: Well suited
Management considerations:
• The plants selected for food plots, forage, or cover should be those that meet the needs of the wildlife species for which they are managed.
• If native trees and shrubs are reintroduced in areas of this map unit, they will produce nuts and berries for food and help to provide cover for wildlife.

Building Site Development

Suitability: Generally suited
Management considerations:
• This soil is not suited to building site development in areas that are subject to flooding.
• Properly designing the foundation of buildings helps to prevent the structural damage caused by shrinking and swelling of the subsoil.
• Constructing roads on well compacted fill material helps to overcome the low strength and prevent the damage caused by heavy vehicular traffic.

Septic Tank Absorption Fields

Suitability: Generally suited
Management considerations:
• This soil is not suited to septic tank absorption fields in areas that are subject to flooding.
• Increasing the size of absorption fields and adding fill material help to overcome the moderately slow or slow permeability of the subsoil.
• Land shaping and land leveling help to overcome slopes of more than 6 percent.

Interpretive Groups

Land capability classification: IIIe

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 36,200 acres in Lewis County, or 11.4 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are in the western and northern parts, mainly in general soil map units 1, 2, 3, 5, 6, and 7, which are described under the heading "General Soil Map Units." Most of this prime farmland is used for crops. Tobacco, corn, soybeans, and hay account for most of the crops grown on this land.

An increasing trend in recent years has been the conversion of some prime farmland to residential and industrial uses. Residential conversion dominates the loss of acreage, but several large tracts have been purchased by industries and have yet to be developed. This loss of prime farmland to other uses puts pressure on marginal lands, which are generally more erodible, droughty, less productive, and cannot be easily cultivated. This loss is magnified by the fact there is so little prime farmland in the survey area.

The map units in the survey area that are considered prime farmland are listed below. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

The map units that meet the requirements for prime farmland are:

AaB	Aaron silt loam, 2 to 6 percent slopes
AsB	Ashton silt loam, 2 to 6 percent slopes
BaB	Beasley silt loam, 2 to 6 percent slopes
BrB	Blairton silt loam, 2 to 6 percent slopes
Bs	Boonesboro silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
ChB	Chavies fine sandy loam, 2 to 6 percent slopes
CoB	Covedale silt loam, 2 to 6 percent slopes
CxB	Crider silt loam, 2 to 6 percent slopes
EkB	Elk silt loam, 2 to 8 percent slopes
HgB	Hagerstown silt loam, 2 to 6 percent slopes
Hn	Haymond silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
Lw	Lawrence silt loam (where drained)
Mc	McGary silt loam

Me	Melvin silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
Mo	Morehead silt loam, rarely flooded
Ne	Newark silt loam, occasionally flooded (where drained)
NhB	Nicholson silt loam, 2 to 6 percent slopes
No	Nolin silt loam, occasionally flooded
OtB	Otwell silt loam, 2 to 6 percent slopes
Se	Sees silt loam, 2 to 4 percent slopes, occasionally flooded
SmB	Shelocta-Skidmore complex, 2 to 6 percent slopes (only the Shelocta soil)
TsB	Tilsit silt loam, 2 to 6 percent slopes
TtB	Trappist silt loam, 2 to 6 percent slopes
WeB	Wheeling loam, 2 to 6 percent slopes
WoB	Woolper silty clay loam, 2 to 6 percent slopes, rarely flooded

Additional Farmland of Statewide Importance

This is land, in addition to prime farmland, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. Generally, additional farmland of statewide importance includes those soils that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some soils may produce as high a yield as prime farmland if conditions are favorable. Generally, additional farmland soils must meet the same criteria as prime farmland with the exception of slope, which ranges mainly from 6 to 12 percent. More detailed information about the criteria for additional farmland of statewide importance is available at the local office of the Natural Resources Conservation Service.

About 17,340 acres in Lewis County, or 5.5 percent of the total acreage, meets the soil requirements for additional farmland of statewide importance. Scattered areas of this land are throughout the county, but most are in the western and northern parts, mainly in general soil map units 1, 2, 3, 5, 6, and 7, which are described under the heading "General Soil Map Units." Most of this additional farmland is used for crops and pasture. Tobacco, corn, soybeans, and hay account for most of the crops grown on this land.

An increasing trend in recent years has involved the conversion of some of the additional farmland for residential development or as a replacement for prime farmland that has been converted to other uses. Residential conversion dominates the loss of acreage, but several large tracts have been purchased by industries and have yet to be developed. This loss is magnified by the fact there is so little additional farmland in the survey area.

The map units in the survey area that are considered additional farmland of statewide importance are listed below. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

The map units that meet the requirements for additional farmland of statewide importance are:

BeC2	Beasley silt loam, 6 to 12 percent slopes, rocky, eroded
BrC2	Blairton silt loam, 6 to 12 percent slopes, eroded
ChC	Chavies fine sandy loam, 6 to 12 percent slopes
CoC2	Covedale silt loam, 6 to 12 percent slopes, eroded
HgC	Hagerstown silt loam, 6 to 12 percent slopes
NhC	Nicholson silt loam, 6 to 12 percent slopes
OtC	Otwell silt loam, 6 to 12 percent slopes
ShC	Shelocta gravelly silt loam, 6 to 12 percent slopes
TsC	Tilsit silt loam, 6 to 12 percent slopes
WeC	Wheeling loam, 6 to 12 percent slopes
WoC	Woolper silty clay loam, 6 to 12 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil, and the system of land capability classification used by the Natural Resources Conservation Service is explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1993, more than 24,410 acres in Lewis County was used for crops (Kentucky Agricultural Statistics Service 1994). Of this acreage, about 2,500 acres was used for alfalfa, about 14,500 acres for other hay crops, 2,210 acres for tobacco, 1,500 acres for soybeans, and 3,700 acres for corn.

The field crops suited to the soils and climate of Lewis County include many that are not now commonly grown. Burley tobacco, corn, and soybeans are the dominant row crops. Grain sorghum, sunflowers, sweet peppers, popcorn, tomatoes, and similar crops can be grown if economic conditions are favorable

Wheat is the most common close-grown crop. Wheat, barley, oats, and rye are generally grown as a winter cover crop in tobacco fields. Grass seed could be produced from fescue, red clover, orchardgrass, bromegrass, and timothy, if the market for them is favorable.

Specialty crops grown in the survey area are vegetables, tree fruits, and nursery plants. In addition, other specialty crops such as Christmas trees, strawberries, small fruits, grapes, melons, and other vegetables can be adapted to the area.

Deep and very deep, well drained soils that warm up early in the spring are especially suited to many vegetables and small fruits. Ashton, Chavies, Crider, Elk, Hagerstown, Wheeling, and Woolper soils that are not flooded and have slopes of less than 6 percent are in this category. These soils make up about 11,750 acres in the survey area. Generally, crops can be planted and harvested earlier on these soils than crops that are grown on other soils in the survey area.

Most of the well drained upland soils are suited to orchards and nursery plants. Soils in low positions on the landscape, where frost is frequent and air drainage

is poor, generally are poorly suited to early vegetables, small fruits, and orchard crops.

The local offices of the Natural Resources Conservation Service and the Kentucky Cooperative Extension Service can provide the latest information and suggestions for growing specialty crops.

Less than 20 percent of the soils in the survey area are well suited to row crops. Most of these soils are on bottom land that is subject to flooding, stream terraces, and ridgetops. The broad, nearly level and gently sloping terraces and ridgetops are suited to grain crops. Very deep and deep, well drained soils, such as those in the Ashton, Beasley, Chavies, Crider, Elk, Hagerstown, Wheeling, and Woolper series, are suited to tobacco and alfalfa. During years of normal rainfall, the moderately well drained Nicholson, Otwell, and Tilsit soils produce high yields of tobacco. Soils that have slopes of 6 to 15 percent and are on terraces and uplands and soils that have a problem with drainage or are subject to frequent flooding and are on flood plains are commonly used for hay and pasture. In addition to land that is currently being cropped, some idle land, pasture, or woodland has potential for use as cropland. Food production could be increased by applying the latest technology to all the cropland in the county. The information in this soil survey can facilitate the application of such technology.

Managing Cropland

The main management needs on the cropland and pasture in the county are measures that help to control erosion, maintain and improve soil fertility and tilth, and minimize water pollution caused by runoff containing soil particles, nutrients, organic matter, pesticides, and herbicides.

Water erosion is the primary management concern on most of the cropland and pasture in Lewis County. It is a hazard if the slope is more than 2 percent. Except for some nearly level soils on flood plains and terraces, such as those in the Ashton, Boonesboro, Elk, Haymond, Kinnick, Newark, Nolin, Skidmore, and Wheeling series, and a few included areas of Aaron, Lawrence, McGary, and Tilsit soils on ridgetops, nearly all the cropland and pasture in the survey area have slopes ranging from 2 to 65 percent. As slope increases, the hazard of erosion and the difficulty in controlling that erosion also increases.

Erosion of the surface layer is damaging because it reduces the productivity of the soils and can result in sedimentation of streams, ponds, lakes, and rivers. Soil productivity is reduced as organic matter and plant nutrients are lost and part of the subsoil is incorporated into the plow layer. Surface erosion is especially damaging on soils that have a clayey subsoil, such as the Beasley and Shrouts soils, and on soils that have a layer, such as a fragipan, in or below the subsoil that limits the root zone, such as in the Lawrence, Nicholson, Otwell, and Tilsit soils. Surface erosion is also a concern on Berks, Blairton, Caneyville, Faywood, Gilpin, and Trappist soils that are moderately deep over bedrock and on Colyer and Fairmount soils that are shallow to bedrock. The pollution caused by erosion reduces the quality of water for municipal and recreational uses and for livestock, fish, and wildlife.

Erosion-control measures generally help to provide a protective vegetative cover, reduce the rate of runoff, and increase the rate of water infiltration. A cropping system that keeps vegetation on the soil for extended periods can generally keep soil losses to an amount that does not reduce the productivity of the soil. On livestock farms, a cropping system that includes grasses and legumes helps to control erosion on sloping land, provides nitrogen, and improves tilth for subsequent crops.

Erosion is controlled in Lewis County mainly through cultural practices, such as a conservation tillage system, a cropping sequence that includes grasses and legumes, cover crops, and a rotation grazing system, rather than through structural measures, such as terraces and diversions. These cultural practices generally are better suited to the irregularly shaped slopes on many of the Beasley, Covedale, Shrouts, and Shelocta soils. Contour farming and contour stripcropping are better suited to soils that have smooth, uniform slopes, such as the Crider, Hagerstown, Nicholson, and Tilsit soils. Information about erosion-control measures for each kind of soil in the county is available at the local office of the Natural Resources Conservation Service.

Soil drainage is a major management concern on about 11.3 percent of the soils in Lewis County used for crops and pasture. Management of drainage in conformance with regulations influencing wetlands may require special permits and extra planning. Unless drained, the somewhat poorly drained soils in the county are so wet that the production of crops is restricted. They include the Lawrence, McGary, Morehead, and Newark soils. These soils make up about 7,640 acres in the survey area.

Small areas of the wetter soils in depressions and along drainageways are commonly included with the moderately well drained Blairton, Nicholson, Otwell, Sees, and Tilsit soils. Drainage systems are not installed in these moderately well drained soils, their wetter inclusions, or in the somewhat poorly drained Lawrence soils. Except for Blairton and Sees soils,

these soils have a hard, compact, brittle fragipan in the subsoil, which limits the depth to which tile drains will function. Open ditches are used in some areas of the somewhat poorly drained Lawrence soils to remove excess water. In areas of the moderately well drained soils, a drainage system generally is not needed, but the crops that can withstand slight wetness should be selected for planting.

The maintenance problems and needs of both surface and subsurface drainage systems vary with the kind of soil. A combination of open ditches and tile drainage is used in the somewhat poorly drained McGary, Morehead, and Newark soils that are intensively row cropped.

Soil fertility is medium or high in all of the soils of Lewis County used for crops and pasture. Although many of the upland soils formed in parent material high in bases, leaching has resulted in the surface layer and upper part of the subsoil of many of these soils becoming acidic. Applications of ground limestone are needed to raise the pH level sufficiently for the production of many crops in these upland soils and also on the soils of flood plains and terraces. The levels of phosphorus and potassium are naturally low in most soils of the survey area. Additions of lime and fertilizer should be based on the results of soil tests, the need of the crop, and the expected level of yields.

The Cooperative Extension Service can help to determine the kind and amount of fertilizer and lime needed and the proper method of application.

Tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils that have good tilth have a surface layer that is granular and porous. Some of the soils in the survey area that are used for crops have a surface layer of silt loam that is light in color and low in organic matter content. Generally, the structure of such soils is weak. A surface crust forms during periods of heavy rainfall. The crust is hard when dry and nearly impervious to water. It reduces the rate of water infiltration and increases the runoff rate. Some of the eroded soils in sloping areas have lost part of their original surface layer, which results in poorer tilth from the increased clay content caused by mixing the plow layer with the clayey subsoil. Other soils have been cropped continuously for long periods, which has removed much of the organic matter and destroyed the surface structure. Applying a system of rotating fields and adding manure and other organic material to the soil help to control erosion and to improve soil structure, permeability, and soil tilth.

In 1994, there were more than 18,000 cattle and calves in Lewis County (Kentucky Agricultural Statistics Service 1994). Although not present in large numbers, sheep and hogs are also raised in the survey area. Most of the hayland and pasture in the county support a mixture of grasses and legumes. Much of the hay is grown in a hay and pasture rotation system. With the exception of alfalfa and clovers, most hay is rolled into large, round bales when it is harvested.

Because about 44 percent of the farm income in Lewis County is derived from the sale of livestock or livestock products, a high-quality forage program is necessary. A successful livestock program depends on a large supply of farm grown feed of good quality. A good forage program can furnish as much as 78 percent of the feed required for beef cattle and 66 percent of that required for dairy cattle (Evans and Lacefield 1977). On much of the pasture in the survey area, renovation, brush control, and measures that prevent overgrazing are needed.

The suitability of the soils in the county to produce grasses and legumes varies widely because of differences in the depth to bedrock or other root limiting layers, drainage, the available water capacity, and many other properties. The selection of forage species is important, and the suitability of the different soils to the selected species should be considered.

The nearly level and gently sloping soils that are deep and well drained should be used for the most productive crops, such as corn silage, alfalfa, and a mixture of alfalfa and orchardgrass or alfalfa and timothy. On the steeper soils, sod-forming grasses, such as tall fescue and bluegrass, are needed to help control erosion. Alfalfa should be grown with cool-season grasses in areas where the soil is well drained and at least 2 feet deep over bedrock. The more poorly drained soils or those that are less than 2 feet deep over bedrock are suited to clover-grass mixtures or to pure stands of clover or grasses. Legumes can be established through renovation in areas that support sod-forming grasses.

Tall fescue is an important cool-season grass that is suited to a wide range of soil conditions. It is grown for both hay and pasture. As it grows during the period August to November, the fescue commonly is allowed to accumulate in the field. It is grazed in the late fall and in winter. Applications of nitrogen fertilizer help to achieve the maximum production when the fescue is accumulating in the field.

Warm-season grasses, which are planted from early in April to late in May, alleviate the "summer slump" of cool-season grasses, such as tall fescue and Kentucky bluegrass. Warm-seasom grasses grow well during the summer, especially from mid-June to September, when the cool-season grasses taper off. Examples of warm-season grasses are big

bluestem, switchgrass, indiangrass, and Caucasian bluestem.

Renovation can increase forage yields in areas that have a good stand of grass. It involves partially destroying the sod, applying lime and fertilizer, and seeding the desirable forage species. Adding legumes to these grass stands helps to provide high-quality feed, increase summer production, and supply nitrogen to the grasses. Under growing conditions in Kentucky, alfalfa can fix 200 to 300 pounds of nitrogen per acre per year; red clover, 100 to 200 pounds; and ladino clover, 100 to 150 pounds. An acre of Korean lespedeza, vetch, or other annual forage legumes can fix 75 to 100 pounds of nitrogen per year (Evans and others 1978).

Additional information about managing pasture and hayland can be obtained from offices of the Natural Resources Conservation Service and the Kentucky Cooperative Extension Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management (USDA SCS 1961). The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is

maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

About 219,200 acres in Lewis County, or about 71 percent of the total acreage, is woodland (USDA Forest Service 1989). The survey area is in the Western Mesophytic Forest Region. The characteristic trees in this region are American beech, American sycamore, black locust, black oak, black walnut, chestnut oak, chinkapin oak, hickory, northern red oak, red maple, sugar maple, white ash, white oak, and yellow-poplar. The dominant forest types are oak-hickory-maple, which makes up about 55 percent of the forest land; central mixed hardwoods, 20 percent; elm-ash, 10 percent; red cedar-hardwoods, 10 percent; and willows-white ash-maple-beech, 5 percent.

The wooded tracts in the survey area are generally private or commercial holdings ranging from a few acres to many thousand acres. Harvesting of timber is usually done by local loggers using either selective-cut methods on most small farm holdings and both selective-cut and clear-cut methods on larger private and commercial tracts. Most of the forest land can produce 50 cubic feet or more of wood per acre per year, but actual production is about 33 cubic feet. The lower production rate is a result of most of the forest land being unmanaged, not well stocked, and cut over too often, and when loggers cut trees, they tend to remove all of the best trees, leaving inferior ones to re-seed the cutover areas. In addition, many tracts in farms are also used as pasture by livestock, resulting in further damage to the woodland. The woodland can be improved by removing low-quality trees from fully stocked and understocked stands of all sizes, replanting after harvest, and restricting livestock access.

The wood industry of Lewis County consists mainly of commercial sawmills and pallet mills. It produces rough lumber, pallets, crossties, dimension stock, pulpwood, wood chips, and fuelwood. Several mills in adjacent counties and states buy logs or standing timber from landowners in the county.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone are major influences of tree growth. Elevation and aspect are of particular importance in mountainous areas, such as in the eastern part of Lewis County. The section "Detailed Soil Map Units" provides information on suitability and management for the soil map units in the county. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce in a pure stand under natural conditions. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management (USDA NRCS "National Forestry Manual").

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion.

Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability (Applequist 1959; Beck 1962; Broadfoot 1960, 1963, 1964; Broadfoot and Krinard 1959; Coile and Schumacher 1953; Nelson, Clutter, and Chaiken 1961; Olson 1959; Tennessee Valley Authority n.d.).

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of

the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

The most important wildlife species in Lewis County are cottontail rabbit, gray squirrel, fox squirrel, raccoon, opossum, skunk, red fox, gray fox, coyote, grouse, wild turkey, bobwhite quail, mourning dove, bobcat, white-tailed deer, and black bear. A number of predatory birds are also found in the county. They include barn owl, screech owl, sparrow hawk, Cooper's hawk, red-tailed hawk, and the occasional osprey and bald eagle along the Ohio River. The survey area also includes many other species of birds and mammals. It has about 34 species of mammals, 110 species of birds, and 33 species of reptiles and amphibians. Although the types of habitat required by wildlife vary, deer and squirrels generally use woodland habitat; rabbits, quail, and doves use openland habitat; and ducks and geese use wetland habitat.

Photographers, birdwatchers, sportsmen, and others are interested in the flora and fauna of Lewis County. The ponds and streams in the survey area are inhabited by a variety of fish, including warm-water game fish, panfish, and rough fish. Examples are largemouth bass and bluegill. The Kinniconick Creek has long been noted for muskie fishing.

Successful management of wildlife habitat requires a suitable combination of food, cover, and water. Lack of any one of these necessities, an imbalance between them, or an inadequate distribution of them can severely limit or eliminate the population of desirable wildlife species.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or

maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, orchardgrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are chicory, goldenrod, beggarweed, aster, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are Virginia pine, white pine, eastern hemlock, and eastern redcedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given

for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and

grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, the available water capacity in the upper 40 inches, and the content of salts, calcium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the degree and kind of soil limitations that affect use of the soil as daily cover for landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a fragipan, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of

landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a fragipan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, and soil reaction affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification

are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, or organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by

toxic substances in the root zone, such as sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas (Karathanasis and others 1986). Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The

classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, more than 6 percent; and *very high*, greater than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission. Some examples are Lakin and Skidmore soils.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. Some examples are Ashton, Boonesboro, Hagerstown, Haymond, Nolin, and Wheeling soils.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission. Some examples are Aaron, Colyer, McGary, Muse, and Shelocta soils.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Physical, Chemical, and Mineralogical Analyses of Selected Soils

The results of physical analyses of several typical pedons in the survey area are given in table 17 and the results of chemical analyses in table 18. Mineralogical data for several pedons are given in table 19. The data are for soils sampled at carefully selected sites. Unless otherwise indicated, the pedons are typical of the series. They are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Kentucky Agricultural Experiment Station, Lexington, Kentucky.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (USDA NRCS 1996).

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all material less than 75 mm (3B1).
Coarse materials—(2-250 mm fraction) volume estimates of the percentages of all material greater than 2 mm (3B2).
Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Extractable cations—ammonium acetate pH 7.0, atomic absorption; calcium (6N2e), magnesium (6O2d), sodium (6P2b), potassium (6Q2b).
Cation-exchange capacity—sum of cations (5A3a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Extractable acidity—barium chloride-triethanolamine I (6H1a).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff 1975). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in sol. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The Trappist series is an example of clayey, mixed, mesic Typic Hapludults.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (Soil Survey Division Staff 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff 1975) and in "Keys to Soil Taxonomy" (Soil Survey Staff 1992). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Aaron Series

Depth class: Deep
Drainage class: Moderately well drained
Permeability: Slow
Landform: Uplands
Landscape position: Moderately broad and broad ridgetops

Parent material: Clayey residuum derived from calcareous clay shale and dolomite of the Upper Crab Orchard Formation of the Silurian System
Slope: 2 to 6 percent
Associated soils: Beasley, Crider, Hagerstown, Lawrence, McGary, Nicholson, and Shrouts
Taxonomic class: Fine, mixed, mesic Oxyaquic Hapludalfs

Typical Pedon

Aaron silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 19); about 2.1 miles northwest of the junction of Kentucky Highway 10 and Kentucky Highway 57 at Tollesboro, about 1.8 miles north of the junction of Kentucky Highway 10 and Garrad Road, about 20 feet east of a farm road, and about 20 feet south of a farm boundary fence; USGS Tollesboro Quadrangle; lat. 38 degrees 35 minutes 04 seconds N. and long. 83 degrees 36 minutes 20 seconds W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale yellow (2.5Y 7/3) dry; weak fine and medium granular structure; very friable; many fine and medium roots; moderately acid; gradual smooth boundary.

AB—8 to 14 inches; brown (10YR 4/3) and yellowish brown (10YR 5/6) silt loam, pale yellow (2.5Y 7/3) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; common fine and few medium roots; moderately acid; clear smooth boundary.

Bt1—14 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; common fine roots; many faint clay films on faces of peds; common fine faint pale brown (10YR 6/3) iron depletions; strongly acid; gradual smooth boundary.

Bt2—21 to 28 inches; yellowish brown (10YR 5/6) clay; moderate fine and medium subangular blocky structure; very firm; common fine roots; many distinct clay films on faces of peds; common medium faint pale brown (10YR 6/3) iron depletions; strongly acid; gradual smooth boundary.

Bt3—28 to 34 inches; yellowish brown (10YR 5/6) clay; many medium and coarse faint light brownish gray (10YR 6/2) and many medium faint pale brown (10YR 6/3) iron depletions; moderate fine angular and subangular blocky structure; very firm; few fine and coarse roots; many distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

BC—34 to 45 inches; yellowish brown (10YR 5/6) clay; weak medium coarse angular blocky structure; very firm; few fine roots; common distinct clay films on faces of peds; many medium and faint light brownish gray (10YR 6/2) iron depletions and many medium distinct strong brown (7.5YR 5/8) masses in which iron has accumulated; moderately acid; clear smooth boundary.

C—45 to 53 inches; strong brown (7.5YR 5/8) and grayish green (5G 4/2) clay; many coarse distinct light olive gray (5Y 6/2) lithochromic mottles; massive; very firm; many fine to coarse grayish green (5G 4/2) glauconite stains and many fine glauconite grains; common distinct slickensides and pressure faces; neutral; abrupt smooth boundary.

R—53 inches; hard, brown dolomitic limestone.

Range of Characteristics

Thickness of the solum: 30 to 50 inches
Depth to bedrock: 40 to 60 inches
Content of clay in the control section: 35 to 60 percent
Kind of rock fragments: Limestone chert
Reaction: Unless limed, strongly acid to slightly alkaline in the A and Bt horizons and moderately acid or slightly acid in the BC and C horizons

Ap horizon:
Hue—10YR
Value—4
Chroma—2 or 3
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 14 percent

AB horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 14 percent

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—4 to 8
Redoximorphic features—shades of brown, gray, or olive
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Content of rock fragments—0 to 14 percent

BC and C horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—4 to 8
Redoximorphic features—shades of brown, gray, or olive
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 34 percent

Ashton Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Ohio River valley
Landscape position: Low terraces on flood plains along the Ohio River
Parent material: Silty, nonlocal alluvium of the Quaternary System
Slope: 2 to 6 percent
Associated soils: Chavies, Crider, Lakin, Lawrence, Morehead, Otwell, and Wheeling
Taxonomic class: Fine-silty, mixed, mesic Mollic Hapludalfs

Typical Pedon

Ashton silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 3); about 0.5 mile northeast of the junction of Kentucky Highway 57 and Kentucky Highway 8 at Concord, about 480 feet north of Kentucky Highway 8, about 350 feet north of the CSX Railroad tracks, and about 400 feet south of the Ohio River; USGS Manchester Islands Quadrangle; lat. 38 degrees 41 minutes 43 seconds N. and long. 83 degrees 30 minutes 40 seconds W.

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; very friable; many fine roots; moderately alkaline; clear smooth boundary.

Bt1—10 to 15 inches; brown (7.5YR 4/4) silt loam; moderate fine and medium subangular blocky structure; friable; common fine roots; many faint clay films on faces of peds; few fine charcoal pieces; moderately alkaline; clear smooth boundary.

Bt2—15 to 28 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; many faint clay films on faces of peds; common fine charcoal pieces; moderately alkaline; gradual smooth boundary.

Bt3—28 to 40 inches; brown (7.5YR 4/4) silty clay loam; moderate medium columnar structure parting to moderate medium subangular blocky; firm; few fine roots; many distinct clay films on faces of peds; few fine charcoal pieces; neutral; gradual smooth boundary.

Bt4—40 to 51 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; few fine roots; many faint clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt5—51 to 62 inches; brown (7.5YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; few fine roots; many faint clay films on faces of peds; moderately acid.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Reaction: Unless limed, moderately acid through neutral

Ap horizon:
Hue—10YR or 7.5YR
Value—3
Chroma—2 or 3
Texture of the fine-earth fraction—silt loam or loam

Bt horizon:
Hue—7.5YR or 5YR
Value—3 to 5
Chroma—3 to 6
Texture of the fine-earth fraction—silt loam, silty clay loam, or loam

C horizon: (if it occurs)
Hue—5YR to 10YR
Value—3 to 5
Chroma—3 to 6
Texture of the fine-earth fraction—silt loam, silty clay loam, or loam

Beasley Series

Depth class: Deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: Uplands
Landscape position: Ridgetops, side slopes, and footslopes
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation and olive, calcareous shales of the Lower and Upper Crab Orchard Formations of the Silurian System and brown dolomite and calcareous shale of the Preachersville Member of the Drakes Formation of the Ordovician System (fig. 13).
Slope: 2 to 30 percent
Associated soils: Aaron, Caneyville, Crider, Hagerstown, McGary, Nicholson, and Shrouts
Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Beasley silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 7); about 2.8 miles northwest of Fearsville, about 0.5 mile north-northwest of East Fork Church, 100 feet west of barn, and 50 feet

south of a farm road; USGS Manchester Islands Quadrangle; lat. 38 degrees 38 minutes 30 seconds N. and long. 83 degrees 32 minutes 02 seconds W.

Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam, yellow (10YR 7/6) dry; weak fine granular structure; friable; common fine roots; 1 percent chert fragments; common faint clay films on faces of peds; neutral; clear smooth boundary.

Bt1—8 to 14 inches; yellowish brown (10YR 5/6) silty clay; weak fine subangular blocky structure; firm; few fine roots; common manganese stains; many distinct clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—14 to 22 inches; yellowish brown (10YR 5/6) silty clay; moderate medium subangular and angular blocky structure; firm; few fine roots; many fine manganese stains; many distinct clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt3—22 to 33 inches; yellowish brown (10YR 5/6) clay; common fine distinct light olive brown (2.5Y 5/4) lithochromic mottles; moderate fine and medium subangular blocky structure; firm; few fine roots; many fine and medium manganese stains; many distinct clay coats lining ped interstices and clay films on faces of peds; neutral; gradual smooth boundary.

C—33 to 42 inches; yellowish brown (10YR 5/8) and light olive brown (2.5Y 5/6) clay; few fine prominent dark greenish gray (5GY 4/1) glauconitic stains and grains; massive; very firm; few fine roots; many fine and medium manganese stains; common medium distinct strong brown (7.5YR 5/8) stains; mildly alkaline; gradual smooth boundary.

Cr—42 to 53 inches; greenish gray (5GY 6/1) and light olive brown (2.5Y 5/6), soft, layered shale; very firm; few fine roots between shale layers; many shale fragments; prominent granular calcium carbonate on shale fragments and between shale layers; moderately alkaline.

R—53 inches; yellowish brown, coarse grained dolomite.

Range of Characteristics

Thickness of the solum: 20 to 40 inches (fig. 14)
Depth to bedrock: 40 to 60 inches
Content of clay in the control section: 35 to 60 percent
Kind of rock fragments: Limestone chert and dolomite
Reaction: Unless limed, very strongly acid to neutral in the solum and neutral to moderately alkaline in the substratum

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 10 percent

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 8
Lithochromic mottles—shades of brown, red, or olive and gray in the lower part of the horizon
Texture of the fine-earth fraction—silty clay and clay
Content of rock fragments—0 to 10 percent

BC horizon: (if it occurs)
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 8
Lithochromic mottles—shades of brown, olive, red, and gray
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 10 percent

C horizon:
Hue—10YR to 5Y
Value—4 or 5
Chroma—2 to 8
Lithochromic mottles—shades of gray, olive, red, and brown
Texture of the fine-earth fraction—clay
Content of rock fragments—0 to 35 percent

Cr/R horizon:
Layered, calcareous shale interbedded with dolomite

Berks Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate and moderately rapid
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Loamy residuum derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation of the Mississippian System
Slope: 30 to 65 percent
Associated soils: Blairton, Brownsville, Gilpin, and Shelocta
Taxonomic class: Loamy-skeletal, mixed, mesic Typic Dystrochrepts

Typical Pedon

Berks channery silt loam, in an area of Berks-Brownsville complex, 30 to 55 percent slopes, very rocky, eroded, in Lewis County (soil atlas sheet 35); about 2.0 miles northeast of the junction of Kentucky Highway 559 and Kentucky Highway 344 at Petersville, about 0.3 mile south of the junction of Kentucky Highway 344 and Bee Branch Road, about 500 feet northwest of Bee Branch Road; USGS Stricklett Quadrangle; lat. 38 degrees 27 minutes 11 seconds N. and long. 83 degrees 27 minutes 23 seconds W.

A—0 to 3 inches; brown (10YR 4/3) channery silt loam, light gray (2.5Y 7/2) dry; weak fine granular structure; very friable; many fine and medium roots; 18 percent sandstone channers; very strongly acid; clear smooth boundary.

Bw1—3 to 8 inches; brown (10YR 5/3) channery loam; weak medium subangular blocky structure; friable; common fine and medium roots; few coarse roots; 30 percent sandstone channers and stones; common faint silt coatings on faces of peds and on coarse fragments; very strongly acid; gradual smooth boundary.

Bw2—8 to 16 inches; yellowish brown (10YR 5/4) very channery loam; weak medium subangular blocky structure; friable; few fine and medium roots; 50 percent sandstone channers and stones; common faint silt coatings on faces of peds and coarse fragments; very strongly acid; clear wavy boundary.

Bw3—16 to 25 inches; yellowish brown (10YR 5/4) extremely channery loam; weak fine and medium subangular blocky structure; friable; few fine roots; 65 percent sandstone channers and stones; common faint silt coatings on faces of peds and coarse fragments; very strongly acid; abrupt smooth boundary.

R—25 inches; unweathered, fine grained sandstone in 6- to 20-inch-thick layers.

Range of Characteristics

Thickness of the solum: 12 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: Less than 35 percent
Kind of rock fragments: Sandstone and siltstone channers and stones
Reaction: Unless limed, extremely acid to slightly acid throughout

A horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture of the fine-earth fraction—silt loam
Content of rock fragments—10 to 34 percent

Bw horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture of the fine-earth fraction—loam or silt loam
Content of rock fragments—35 to 70 percent

BC horizon: (if it occurs)
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture of the fine-earth fraction—loam or silt loam
Content of rock fragments—35 to 90 percent

C horizon: (if it occurs)
Hue—5YR to 2.5Y
Value—4 to 6
Chroma—2 to 8
Texture of the fine-earth fraction—loam or silt loam
Content of rock fragments—35 to 90 percent

Blairton Series

Depth class: Moderately deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Silty residuum derived from shale and sandstone of the Bedford Formation and sandstone, siltstone, and shale of the Farmers and Nancy Members of the Borden Formation of the Mississippian System
Slope: 2 to 30 percent
Associated soils: Berks, Brownsville, Shelocta, and Tilsit
Taxonomic class: Fine-loamy, mixed, mesic Aquic Hapludults

Typical Pedon

Blairton silt loam, 12 to 30 percent slopes, eroded, in Lewis County (soil atlas sheet 39); about 2.9 miles southeast of Petersville, 1.0 mile west of the confluence of Hardy Fork and Indian Creek, 720 feet north of a gravel road; USGS Stricklett Quadrangle; lat. 38 degrees 24 minutes 36 seconds N. and long. 83 degrees 27 minutes 24 seconds W.

Ap—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many fine and medium

roots; 2 percent ironstone gravel; very strongly acid; abrupt smooth boundary.

AB—2 to 5 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure parting to weak fine granular; very friable; common fine and medium roots, very few coarse roots; 3 percent ironstone gravel; very strongly acid; clear smooth boundary.

Bt1—5 to 14 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm; few fine and medium roots; many distinct clay films on faces of peds; 5 percent ironstone gravel; very strongly acid; clear smooth boundary.

Bt2—14 to 24 inches; yellowish brown (10YR 5/6) gravelly silt loam; moderate medium and fine angular blocky structure; very firm; few fine roots; many distinct clay films on faces of peds; common fine distinct light brownish gray (2.5Y 6/2) iron depletions and few fine faint dark yellowish brown (10YR 4/6) masses in which iron has accumulated; 25 percent ironstone gravel and 1 percent sandstone channers; very strongly acid; clear smooth boundary.

Bt3—24 to 31 inches; yellowish brown (10YR 5/8) gravelly silt loam; common medium prominent greenish gray (5GY 7/1) and few medium prominent yellowish red (5YR 5/8) lithochromic mottles; weak fine and medium subangular blocky structure; very firm; few fine roots; many distinct strong brown (7.5YR 5/8) clay films on faces of peds; 20 percent ironstone gravel; very strongly acid; abrupt wavy boundary.

Cr—31 to 38 inches; yellowish brown (10YR 5/8) layered ironstone and shale; many distinct light yellowish brown (2.5Y 6/4) silt coatings on ironstone and shale; very few fine roots; very strongly acid.

Range of Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Sandstone, siltstone, shale, and ironstone
Reaction: Unless limed, extremely acid or very strongly acid

Ap and AB horizons:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 14 percent

Bt horizon:
Hue—7.5YR to 2.5Y
Value—5 or 6
Chroma—4 to 8
Redoximorphic features—shades of brown, red, and olive with gray below a depth of 17 inches
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—5 to 34 percent

C horizon: (if it occurs)
Hue—7.5YR to 2.5YR
Value—4 to 6
Chroma—2 to 8
Redoximorphic and lithochromic features—shades of brown, red, olive, and gray
Texture of the fine-earth fraction—silt loam, silty clay loam, or loam
Content of rock fragments—15 to 60 percent

Boonesboro Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Rapid
Landform: Narrow and moderately wide stream valleys
Landscape position: Flood plains
Parent material: Loamy, local alluvium derived from limestone and calcareous shale of the Quaternary System deposited over limestone bedrock of the Grant Lake and Bull Fork Formations of the Ordovician System
Slope: 0 to 3 percent
Associated soils: Kinnick and Woolper
Taxonomic class: Fine-loamy, mixed, mesic Fluventic Hapludolls

Typical Pedon

Boonesboro silt loam, frequently flooded, in Lewis County (soil atlas sheet 13); about 2.5 miles northwest of Poplar Flat, 1.9 miles southeast of Hymes Knob, 0.5 mile west-southwest of the confluence of Fry Branch Creek and the East Fork Cabin Creek; USGS Tollesboro Quadrangle; lat. 38 degrees 33 minutes 28 seconds N. and long. 83 degrees 37 minutes 08 seconds W.

A1—0 to 2 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; very friable; many fine roots; 3 percent chert and limestone gravel; neutral; clear smooth boundary.

A2—2 to 10 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to weak fine granular;

Figure 13.—An example of the Preachersville Member of the Drakes Formation showing the interbedded layers of brown dolomite and grayish green shale.

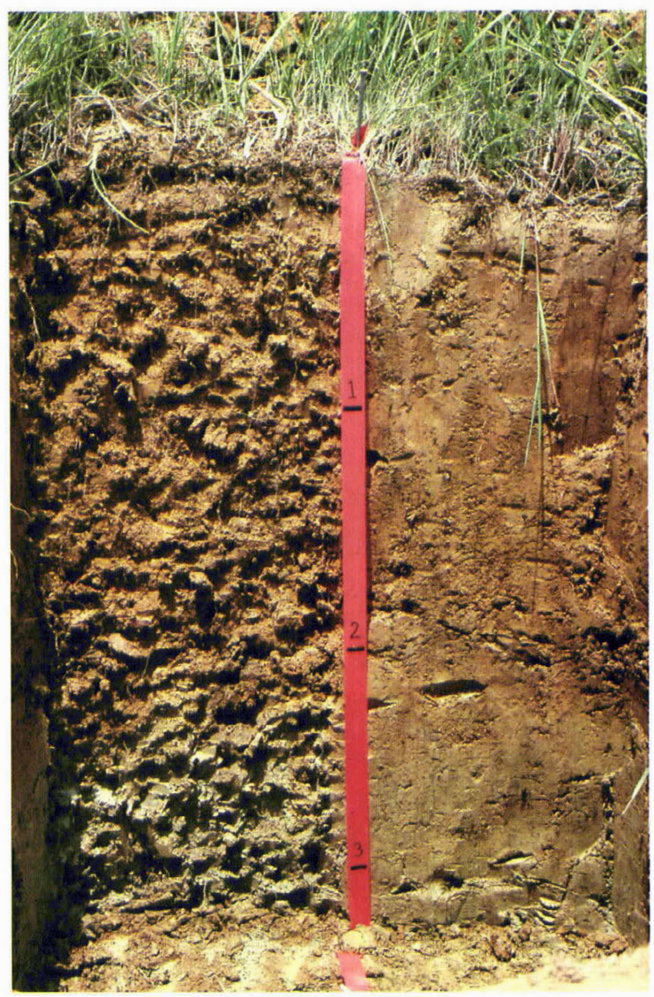

Figure 14.—A typical profile of Beasley soils showing brown colors in the upper part of the solum and greenish gray shale in the C and Cr horizons.

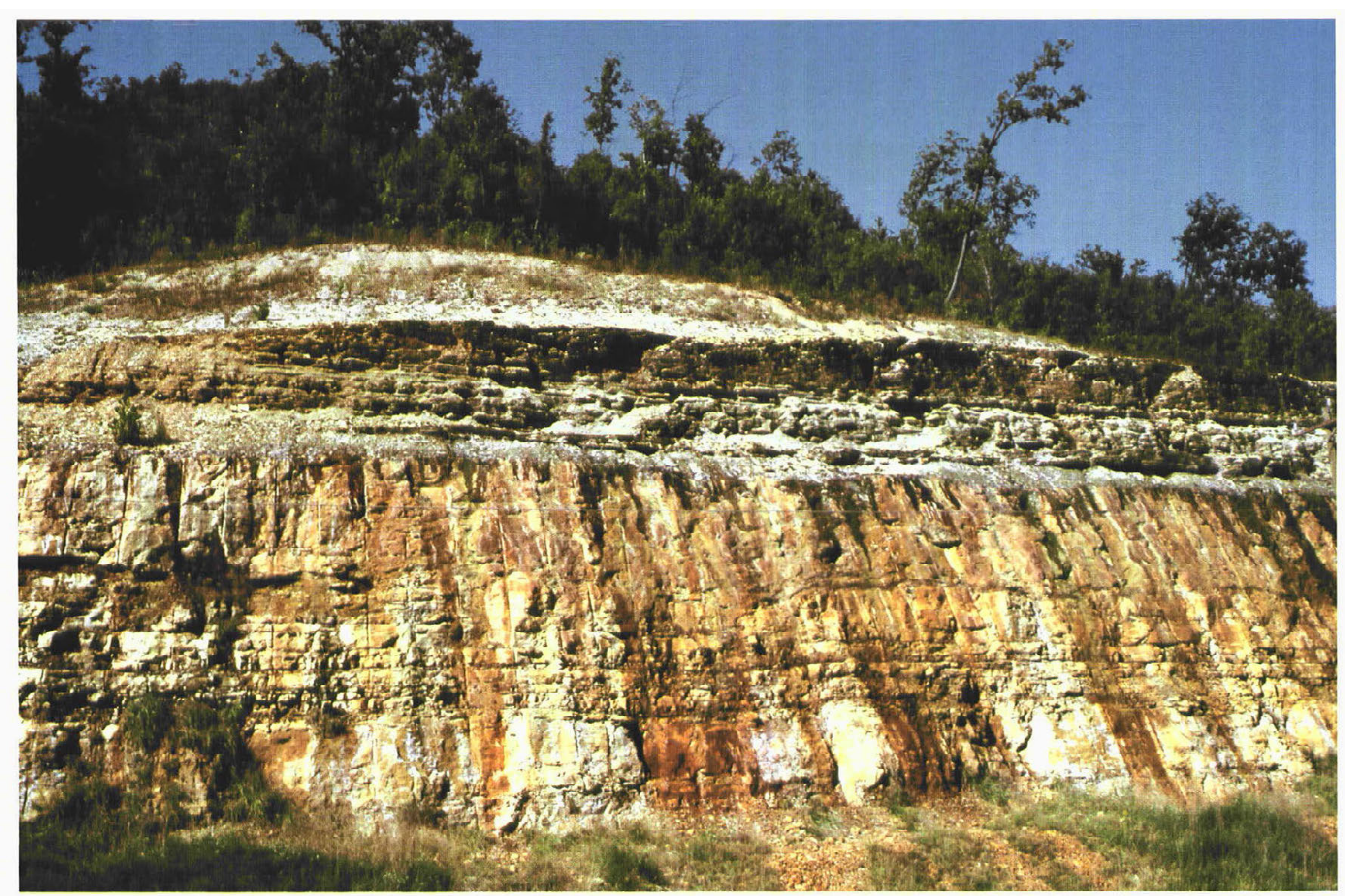

Figure 15.—An example of the brown dolomite of the Bisher Formation.

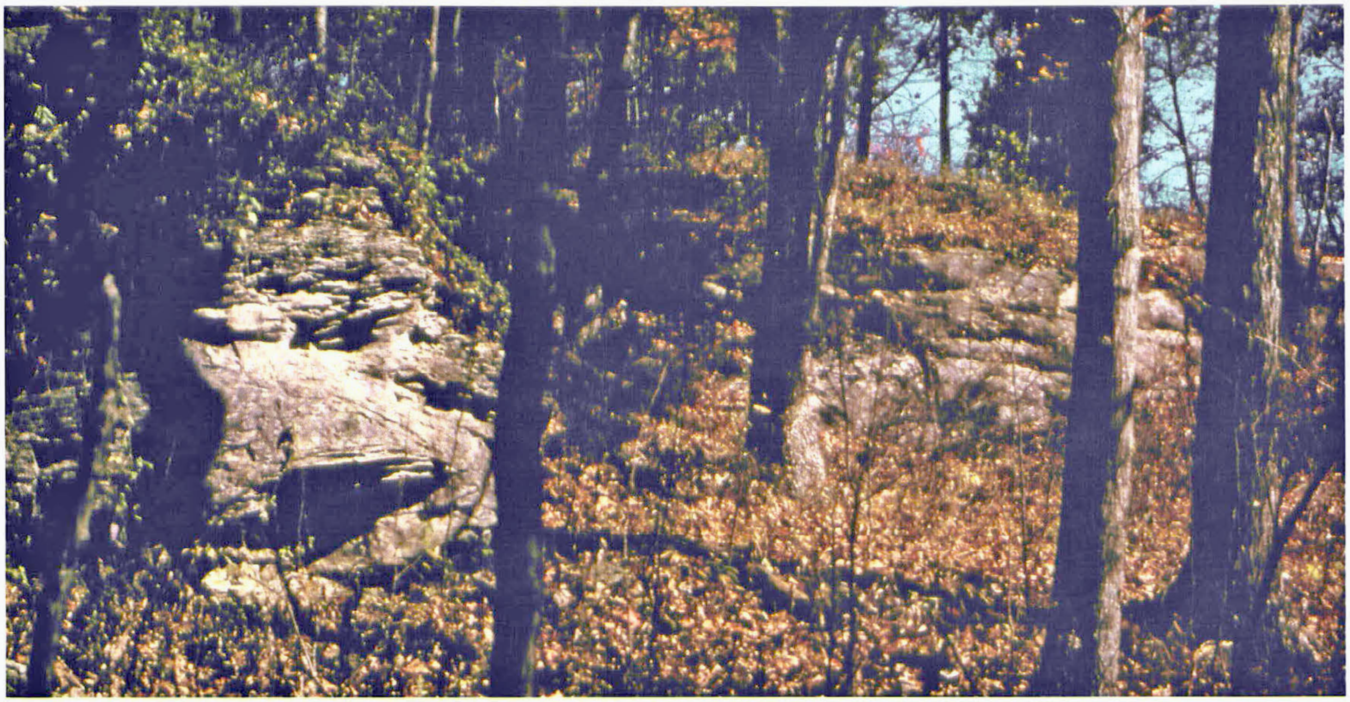

Figure 16.—An example of the Newman Limestone Formation along the eastern edge of Lewis County.

Figure 17.—Thinly bedded, carbonaceous, black, fissile shale of the Ohio Shale Formation.

Figure 18.—Large, detached boulders of Bisher dolomite in a sloping area of Hagerstown soils.

friable; common fine roots; 5 percent chert and limestone gravel; moderately alkaline; gradual smooth boundary.

Bw1—10 to 17 inches; brown (10YR 4/3) gravelly silt loam; moderate fine and medium subangular blocky structure parting to weak fine granular; friable; common fine roots; 15 percent limestone and chert gravel; moderately alkaline; clear smooth boundary.

Bw2—17 to 25 inches; brown (10YR 4/3) very gravelly silty clay loam; weak fine subangular blocky structure parting to weak fine granular; friable; common fine roots; 40 percent limestone and chert gravel; moderately alkaline; abrupt irregular boundary.

R—25 inches; layered limestone separated with thin layers of clay shale.

Range of Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Chert and limestone gravel
Reaction: Slightly acid to moderately alkaline throughout

A horizon:
Hue—10YR
Value—3
Chroma—3
Texture of the fine-earth fraction—silt loam
Content of rock fragments—3 to 10 percent

Bw horizon:
Hue—10YR
Value—4
Chroma—3
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—15 to 40 percent

C horizon: (if it occurs)
Hue—10YR
Value—4
Chroma—4
Texture of the fine-earth fraction—silty clay loam
Content of rock fragments—20 to 30 percent

Brownsville Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Loamy colluvium derived from sandstone, siltstone, and shale of the Borden Formation and sandstone of the Berea Formation of the Mississippian System
Slope: 30 to 65 percent
Associated soils: Berks, Blairton, Gilpin, and Shelocta
Taxonomic class: Loamy-skeletal, mixed, mesic Typic Dystrochrepts

Typical Pedon

Brownsville very channery loam, in an area of Berks-Brownsville-Shelocta complex, 30 to 65 percent slopes, eroded, in Lewis County (soil atlas sheet 36); about 4.0 miles west of the junction of Kentucky Highway 1066 and Kentucky Highway 59 at Laurel Point Church, about 2.1 miles northeast of Awe, and about 0.4 mile south of the junction of Straight Fork Road and Saylor Branch Road; USGS Head of Grassy Quadrangle; lat. 38 degrees 25 minutes 55 seconds N. and long. 83 degrees 18 minutes 31 seconds W.

A—0 to 4 inches; brown (10YR 4/3) very channery loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; many fine and medium roots; 35 percent sandstone channers; strongly acid; clear wavy boundary.

Bw1—4 to 22 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; 30 percent sandstone channers; strongly acid; gradual wavy boundary.

Bw2—22 to 34 inches; yellowish brown (10YR 5/4) very channery silt loam; weak fine subangular blocky structure; friable; common fine roots; 50 percent sandstone channers; moderately acid; clear smooth boundary.

Bw3—34 to 43 inches; yellowish brown (10YR 5/4) very channery loam; weak fine subangular blocky structure; friable; few fine roots; 55 percent sandstone channers; slightly acid; abrupt smooth boundary.

C—43 to 62 inches; yellowish brown (10YR 5/4) extremely channery loam; massive; friable; 70 percent sandstone channers; moderately acid; abrupt smooth boundary.

R—62 inches; unweathered, fine grained sandstone.

Range of Characteristics

Thickness of the solum: 24 to 55 inches
Depth to bedrock: 40 to 72 inches
Content of clay in the control section: Less than 35 percent
Kind of rock fragments: Sandstone and siltstone channers and stones
Reaction: Extremely acid to slightly acid in the surface layer, extremely acid to strongly acid in the solum, and extremely acid to moderately acid in the substratum

A horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture of the fine-earth fraction—loam
Content of rock fragments—10 to 35 percent

Bw horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—4 to 6
Texture of the fine-earth fraction—loam
Content of rock fragments—30 to 70 percent, by volume

C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—4 to 6
Texture of the fine-earth fraction—loam
Content of rock fragments—35 to 80 percent, by volume

Caneyville Series

Depth class: Moderate
Drainage class: Well drained
Permeability: Moderately slow
Landform: Uplands
Landscape position: Ridgetops and upper side slopes
Parent material: Clayey residuum derived from coarse grained dolomite of the Bisher Formation of the Silurian System (fig. 15) in the western part of the county and clayey residuum derived from limestone and shale of the Newman Limestone Formation of the Mississippian System in the eastern part of the county (fig. 16)
Slope: 12 to 45 percent
Associated soils: Beasley, Crider, Gilpin, and Hagerstown
Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Caneyville silt loam, in an area of Caneyville-Hagerstown-Rock outcrop complex, 12 to 45 percent slopes, eroded, in Lewis County (soil atlas sheet 7B); about 2.8 miles south of the junction of Kentucky Highway 57 and Kentucky Highway 8 at Concord, about 0.1 mile east of the junction of Kentucky Highway 57 and Crooked Creek Road, and about 800 feet west of Kentucky Highway 57; USGS Manchester Islands Quadrangle; lat. 38 degrees 39 seconds 25 minutes N. and long. 83 degrees 31 minutes 32 seconds W.

A—0 to 7 inches; brown (7.5YR 4/4) silt loam, reddish yellow (7.5YR 6/6) dry; weak fine granular structure parting to weak fine subangular blocky; friable; few fine and common medium and coarse roots; slightly acid; clear wavy boundary.

Bt1—7 to 13 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; one coarse and few fine roots; common medium faint clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—13 to 23 inches; yellowish red (5YR 4/6) silty clay; strong medium and coarse subangular blocky structure; very firm; few fine roots; common medium and coarse faint clay films on faces of peds; neutral; clear smooth boundary.

BC—23 to 31 inches; yellowish red (5YR 4/6) clay; weak medium subangular blocky structure; friable; very few coarse roots; 1 percent limestone channers; few medium faint clay films on faces of peds and fracture planes; slightly acid.

R—31 inches; yellowish brown (10YR 5/6), coarse grained dolomite.

Range of Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: 35 to 60 percent
Kind of rock fragments: Limestone, chert, and dolomite
Reaction: Very strongly acid to neutral in the upper part of the solum and moderately acid to mildly alkaline in the lower part

A horizon:
Hue—7.5YR or 10YR
Value—4 to 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 10 percent

Bt horizon:
Hue—2.5YR to 10YR
Value—4 to 6
Chroma—4 to 8
Texture of the fine-earth fraction—silty clay loam or silty clay
Content of rock fragments—0 to 10 percent

BC horizon:
Hue—2.5YR to 10YR
Value—4 to 6
Chroma—4 to 8
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 34 percent

Chavies Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Ohio River valley
Landscape position: Terraces
Parent material: Sandy, nonlocal alluvium, eolian sands, and glacial outwash of the Quaternary System
Slope: 2 to 12 percent
Associated soils: Ashton, Lakin, Morehead, Otwell, and Wheeling
Taxonomic class: Coarse-loamy, mixed, mesic Ultic Hapludalfs

Typical Pedon

Chavies fine sandy loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 3); about 3.1 miles west of the intersection of Kentucky Highway 57 and Kentucky Highway 8 at Concord, 1,800 feet north of Kentucky Highway 8, about 250 feet north of the CSX Railroad tracks, and about 30 feet west of a farm road; USGS Manchester Islands Quadrangle; lat. 38 degrees 41 minutes 38 seconds N. and long. 83 degrees 37 minutes 08 seconds W.

Ap—0 to 8 inches; light yellowish brown (10YR 6/4) fine sandy loam, brown (10YR 4/3) dry; moderate fine granular structure and some single grain; very friable; few fine roots; moderately alkaline; clear smooth boundary.

Bt1—8 to 22 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine and medium subangular blocky structure; very friable; few fine roots; few faint clay bridges on sand grains; moderately alkaline; gradual smooth boundary.

Bt2—22 to 49 inches; dark yellowish brown (10YR 4/6) fine sandy loam; moderate fine and medium subangular blocky structure in the upper part and weak medium and coarse subangular blocky structure in the lower part; very friable; few fine roots; few faint clay films on faces of peds and

common faint clay bridges on sand grains; moderately acid; clear smooth boundary.

Bt3—49 to 54 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak coarse subangular blocky structure and single grain; very friable; few faint clay films and many clay bridges on sand grains; very strongly acid; clear smooth boundary.

C—54 to 66 inches; yellowish brown (10YR 5/6) loamy fine sand; structureless and single grain; very friable; very strongly acid.

Range of Characteristics

Thickness of the solum: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: Less than 18 percent
Kind of rock fragments: Rounded quartz gravel
Reaction: Unless limed, very strongly acid to neutral in the solum and very strongly acid to moderately acid in the substratum

Ap horizon:
Hue—7.5YR to 10YR
Value—3 to 5
Chroma—2 to 4
Texture of the fine-earth fraction—fine sandy loam
Content of rock fragments—0 to 15 percent

Bt horizon:
Hue—5YR to 10YR
Value—4 to 6
Chroma—3 to 6
Texture of the fine-earth fraction—silt loam, fine sandy loam, or loam
Content of rock fragments—0 to 15 percent

C horizon:
Hue—5YR to 10YR
Value—4 to 6
Chroma—3 to 6
Texture of the fine-earth fraction—silt loam, fine sandy loam, loam, sandy loam, or loamy fine sand
Content of rock fragments—0 to 30 percent

Colyer Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Slow
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Clayey residuum derived from black, fissile shale of the Ohio Shale Formation of the Devonian System (fig. 17) and the Sunbury Formation of the Mississippian System
Slope: 12 to 60 percent
Associated soils: Covedale and Trappist
Taxonomic class: Clayey-skeletal, mixed, mesic Lithic Dystrochrepts

Typical Pedon

Colyer silt loam, in an area of Colyer-Trappist silt loams, 12 to 60 percent slopes, eroded, in Lewis County (soil atlas sheet 7); about 1.1 miles southeast of Covedale, 0.3 mile northeast of Pine Grove Church, and 150 feet north of the summit of Big Brier Knob; USGS Manchester Islands Quadrangle; lat. 38 degrees 39 minutes 18 seconds N. and long. 83 degrees 29 minutes 59 seconds W.

A—0 to 2 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; 10 percent shale fragments and 2 percent sandstone channers; very strongly acid; clear smooth boundary.

Bw—2 to 5 inches; yellowish brown (10YR 5/4) and yellowish red (5YR 5/6) channery silty clay; moderate fine and medium subangular blocky structure; 25 percent black shale channers; very strongly acid; clear smooth boundary.

BC—5 to 12 inches; strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) very channery clay; common medium prominent pale olive (5Y 6/3) lithochromic mottles; moderate medium subangular and angular blocky structure; 50 percent black shale channers; very strongly acid; gradual wavy boundary.

C—12 to 19 inches; strong brown (7.5YR 5/6) extremely channery clay; many coarse prominent pale olive (5Y 6/3) lithochromic mottles; weak medium angular and subangular blocky structure; weak thin platy structure; 80 percent shale channers; very strongly acid; abrupt smooth boundary.

R—19 inches; layered, hard, black (10YR 2/1), fissile shale.

Range of Characteristics

Thickness of the solum: 8 to 20 inches
Depth to bedrock: 8 to 20 inches
Content of clay in the control section: More than 35 percent
Kind of rock fragments: Black shale
Reaction: Unless limed, extremely acid or very strongly acid

A horizon:
Hue—10YR or 2.5Y
Value—2 to 4
Chroma—1 to 4

Texture of the fine-earth fraction—silt loam
Content of rock fragments—5 to 40 percent

Bw horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—4 to 6
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Content of rock fragments—25 to 50 percent

BC horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—6 to 8
Lithochromic mottles—shades of olive
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—35 to 50 percent

C horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—4 to 6
Lithochromic mottles—shades of olive
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—35 to 90 percent

Covedale Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Uplands and stream valleys
Landscape position: Side slopes, footslopes, toeslopes, and fans
Parent material: Silty colluvium or residuum derived from black, fissile shales of the Ohio Shale Formation of the Devonian System and the Sunbury Formation of the Mississippian System
Slope: 2 to 55 percent
Associated soils: Colyer, Trappist, Shrouts, and Shelocta
Taxonomic class: Fine-silty, mixed, mesic Typic Paleudults

Typical Pedon

Covedale silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 34); about 1.1 miles southeast of Carpenter Corners in Fleming County, about 0.5 mile northwest of Bowman Springs, 400 feet north of the North Fork of the Licking River, which forms the Fleming-Lewis County line, and about 40 feet south of a gravel road; USGS Burtonville Quadrangle; lat. 38 degrees 25 minutes 45 seconds N. and long. 83 degrees 34 minutes 12 seconds W.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common fine roots; moderately alkaline; clear smooth boundary.

Bt/A—7 to 10 inches; yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) silty clay loam; weak fine and medium subangular blocky structure; firm; common fine roots; few faint clay films on faces of peds; moderately alkaline; clear smooth boundary.

Bt1—10 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; less than 1 percent ironstone gravel; many distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—28 to 44 inches; yellowish brown (10YR 5/6) silty clay loam; common fine and medium prominent light yellowish brown (2.5Y 6/3) lithochromic mottles; moderate medium subangular blocky structure; very firm; less than 1 percent ironstone gravel; many distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—44 to 67 inches; yellowish brown (10YR 5/6 and 5/8) silty clay loam; many medium faint light gray (10YR 7/2) lithochromic mottles; weak medium and coarse subangular blocky structure; very firm; 1 percent ironstone gravel and very strongly cemented black shale channers; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

C—67 to 71 inches; light gray (10YR 7/2) and brownish yellow (10YR 6/8) silty clay; massive; very firm; 2 percent very strongly cemented black shale and ironstone channers; very strongly acid.

Range of Characteristics

Thickness of the solum: More than 60 inches
Depth to bedrock: 60 to more than 96 inches
Content of clay in the control section: 25 to 35 percent
Kind of rock fragments: Black, fissile shale, sandstone, ironstone, and siltstone
Reaction: Unless limed, extremely acid or very strongly acid throughout

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 6
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 15 percent

Bt/A horizon:
Hue—10YR

Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 15 percent

Bt horizon:
Hue—dominantly 5YR to 10YR but the range includes 2.5YR in the lower part of the horizon
Value—4 to 6
Chroma—dominantly 4 to 8 but the range includes 2 in the lower part of the horizon
Lithochromic mottles—shades of red, yellow, brown, and gray
Texture of the fine-earth fraction—silt loam, silty clay loam, silty clay, or clay
Content of rock fragments—0 to 60 percent

C horizon:
Hue—2.5YR to 5Y
Value—4 to 7
Chroma—1 to 8
Lithochromic mottles—shades of red, yellow, and gray
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 60 percent

Crider Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Uplands
Landscape position: Ridgetops
Parent material: Silty material over clayey residuum derived from dolomitic limestone of the Bisher and Lower Crab Orchard Formations of the Silurian System
Slope: 2 to 6 percent
Associated soils: Aaron, Ashton, Beasley, Caneyville, Hagerstown, and Nicholson
Taxonomic class: Fine-silty, mixed, mesic Typic Paleudalfs

Typical Pedon

Crider silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 3); about 1.0 mile east of Covedale, 0.6 mile north of the junction of Crooked Creek Road and Engle Road, and 450 feet west of Engle Road; USGS Manchester Islands Quadrangle; lat. 38 degrees 40 minutes 33 seconds N. and long. 83 degrees 32 minutes 22 seconds W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

AB—10 to 17 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/6) silt loam, brownish yellow (10YR 6/8) dry; weak medium subangular blocky and weak fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

Bt1—17 to 29 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light olive brown (2.5Y 5/4) lithochromic mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—29 to 39 inches; strong brown (7.5YR 5/8) silt loam; common medium distinct light yellowish brown (2.5Y 6/4) lithochromic mottles; moderate medium and coarse subangular blocky structure; firm; few fine roots; common very fine manganese concretions; many distinct clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt3—39 to 51 inches; yellowish red (5YR 5/8) silty clay; strong medium subangular blocky structure; firm; many fine manganese concretions; many distinct clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt4—51 to 72 inches; yellowish red (5YR 5/8) clay; few fine prominent light yellowish brown (2.5Y 6/4) lithochromic mottles; strong medium columnar structure parting to strong medium subangular blocky; firm; many fine manganese concretions; many distinct clay films on faces of peds; moderately acid.

Range of Characteristics

Thickness of the solum: 60 to more than 100 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Limestone chert
Reaction: Unless limed, strongly acid to neutral within a depth of 40 inches and very strongly acid to slightly acid below a depth of 40 inches

Ap horizon:
Hue—7.5YR to 10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bt horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—4 to 8
Lithochromic mottles—shades of yellow or brown

Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 10 percent

2Bt horizon:
Hue—10R to 5YR
Value—3 to 5
Chroma—4 to 8
Lithochromic mottles—shades of red, yellow, brown, or, in the lower part of the horizon, gray
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 15 percent

Elk Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Stream valleys
Landscape position: Terraces along major streams
Parent material: Silty, local alluvium derived from limestone, siltstone, shale, and loess of the Quaternary System
Slope: 2 to 8 percent
Associated soils: Otwell, Shelocta, and Woolper
Taxonomic class: Fine-silty, mixed, mesic Ultic Hapludalfs

Typical Pedon

Elk silt loam, 2 to 8 percent slopes, in Lewis County (soil atlas sheet 24); 1.8 miles southwest of Orangeburg, 1.25 miles southeast of the confluence of Middle Run Creek and North Fork Licking River, 0.94 mile northeast of Antioch Church, and 100 feet north of the North Fork Licking River; USGS Orangeburg Quadrangle; lat. 38 degrees 33 minutes 07 seconds N. and long. 83 degrees 43 minutes 08 seconds W.

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; very friable; common fine roots; common fine manganese concretions; moderately acid; gradual smooth boundary.

AB—8 to 18 inches; dark yellowish brown (10YR 3/4) silt loam; moderate fine granular structure; very friable; common fine roots; common fine manganese concretions; moderately acid; gradual smooth boundary.

Bt1—18 to 35 inches; dark yellowish brown (10YR 4/6) silt loam; weak fine and medium subangular blocky structure; friable; few fine roots; common fine manganese concretions; few faint clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—35 to 46 inches; yellowish brown (10YR 5/6) silt loam; moderate fine and medium subangular blocky and angular blocky structure; firm; few fine roots; many fine manganese stains and concretions; common fine clay films on faces of peds; moderately acid; gradual smooth boundary.

BC—46 to 66 inches; yellowish brown (10YR 5/6) silty clay loam; weak thin platy and weak fine and medium subangular blocky structure; very firm; few fine roots; 1 percent gravel; common distinct clay films on peds; moderately acid; clear smooth boundary.

2C—66 to 75 inches; olive (5Y 5/4) clay; very firm; many fine manganese stains; many fine faint olive gray (5Y 5/2) iron depletions; common fine faint brownish yellow (10YR 6/8) masses in which iron has accumulated; mildly alkaline.

Range of Characteristics

Thickness of the solum: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Limestone gravel and chert
Reaction: Dominantly very strongly acid to slightly acid throughout; may range to slightly alkaline in pedons with a lithologic discontinuity or a 2C horizon below a depth of 50 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

AB horizon:
Hue—10YR
Value—3 or 4
Chroma—4 to 6
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Redoximorphic features—shades of gray in the lower part of some pedons
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

BC horizon:
Hue—10YR
Value—4 or 5
Chroma—4 to 6

Redoximorphic features—shades of gray in some pedons
Texture of the fine-earth fraction—silty clay loam or silty clay
Content of rock fragments—0 to 10 percent

2C horizon: (if it occurs)
Hue—10YR to 5Y
Value—4 or 5
Chroma—4 to 8
Redoximorphic features—shades of yellow, brown, or gray
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 20 percent

Fairmount Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Slow or moderately slow
Landform: Uplands
Landscape position: Side slopes
Parent material: Clayey residuum derived from limestone and shale of the Bull Fork Formation of the Ordovician System
Slope: 20 to 55 percent
Associated soils: Faywood and Woolper
Taxonomic class: Clayey, mixed, mesic Lithic Hapludolls

Typical Pedon

Fairmount very flaggy silty clay loam, in an area of Fairmount-Faywood complex, 20 to 55 percent slopes, very rocky, eroded, in Lewis County (soil atlas sheet 13); about 4 miles northwest of the junction of Kentucky Highway 57 and Kentucky Highway 10 at Tollesboro, 0.4 mile east of the confluence of the East Fork of Cabin Creek and Cabin Creek, 720 feet north of Cabin Creek, and 100 feet north of a fence; USGS Manchester Islands Quadrangle; lat. 38 degrees 35 minutes 37 seconds N. and long. 83 degrees 37 minutes 02 seconds W.

A—0 to 4 inches; dark brown (10YR 3/3) very flaggy silty clay loam, brown (10YR 5/3) dry; weak fine granular structure; friable; many fine and common medium roots; 35 percent limestone flagstones; moderately alkaline; clear smooth boundary.

Bw—4 to 12 inches; dark yellowish brown (10YR 4/4) flaggy silty clay; moderate medium subangular and angular blocky structure; firm; common fine and few medium and coarse roots; 30 percent limestone flagstones and channers; moderately alkaline; abrupt smooth boundary.

R—12 inches; hard limestone.

Range of Characteristics

Thickness of the solum: 10 to 20 inches
Depth to bedrock: 10 to 20 inches
Content of clay in the control section: More than 35 percent
Kind of rock fragments: Limestone channers and flagstones
Reaction: Neutral to moderately alkaline throughout

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture of the fine-earth fraction—silty clay loam
Content of rock fragments—15 to 35 percent

Bw horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—15 to 35 percent

Faywood Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow or moderately slow
Landform: Uplands
Landscape position: Side slopes
Parent material: Clayey residuum derived from limestone and shale of the Bull Fork Formation of the Ordovician System
Slope: 20 to 55 percent
Associated soils: Fairmount and Woolper
Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Faywood silty clay loam, in an area of Fairmount-Faywood complex, 20 to 55 percent slopes, very rocky, eroded, in Lewis County (soil atlas sheet 3); about 1.4 miles east of Trinity, 0.7 mile northeast of Trinity Church, and 400 feet northeast of a farm road; USGS Manchester Islands Quadrangle; lat. 38 degrees 40 minutes 24 seconds N. and long. 83 degrees 34 minutes 33 seconds W.

A—0 to 4 inches; brown (10YR 4/3) silty clay loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure parting to weak fine subangular blocky; friable; many fine roots; slightly acid; clear smooth boundary.

Bt1—4 to 15 inches; olive brown (2.5Y 4/4) silty clay; moderate medium subangular blocky structure;

firm; common fine roots; common distinct clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—15 to 26 inches; olive brown (2.5Y 4/4) clay; common medium distinct light brownish gray (2.5Y 6/2) lithochromic mottles; moderate medium subangular blocky structure; very firm; many distinct clay films on faces of peds; moderately acid; abrupt smooth boundary.

R—26 inches; hard limestone.

Range of Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: 35 to 60 percent
Kind of rock fragments: Limestone channers and flagstones
Reaction: Unless limed, strongly acid to neutral throughout

A horizon:
Hue—10YR
Value—4
Chroma—3
Texture of the fine-earth fraction—silty clay loam
Content of rock fragments—0 to 10 percent

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Lithochromic mottles—shades of brown, olive, or gray
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Content of rock fragments—0 to 15 percent

C horizon: (if it occurs)
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 6
Lithochromic mottles—Shades of brown, olive, or gray
Texture of the fine-earth fraction—Silty clay or clay
Content of rock fragments—0 to 20 percent

Gilpin Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Loamy residuum derived from shale, sandstone, and siltstone of the Borden Formation of the Mississippian System and sandstone and shale of the undivided Breathitt and Lee Formations of the Pennsylvanian System
Slope: 6 to 45 percent
Associated soils: Berks, Brownsville, Caneyville, Shelocta, and Tilsit
Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludults

Typical Pedon

Gilpin silt loam, 20 to 45 percent slopes, eroded, in Lewis County (soil atlas sheet 16); about 0.8 mile southeast of Garrison, 0.4 mile south of the confluence of Montgomery Creek and Kinniconick Creek, and 800 feet east of Burris Hollow; lat. 38 degrees 36 minutes 07 seconds N. and long. 83 degrees 09 minutes 38 seconds W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) and brown (10YR 5/3) silt loam, very pale brown (10YR 7/4) dry; weak fine granular structure; very friable; many fine and medium and few coarse roots; 10 percent siltstone channers; strongly acid; clear smooth boundary.

BA—5 to 11 inches; light yellowish brown (2.5Y 6/4) loam; moderate fine subangular blocky structure; friable; many fine and medium roots; 10 percent siltstone channers; very strongly acid; clear smooth boundary.

Bt1—11 to 19 inches; yellowish brown (10YR 5/6) channery loam; moderate fine subangular blocky structure; friable; few fine roots; 20 percent siltstone channers; common distinct strong brown (7.5YR 5/6) clay films on faces of peds; extremely acid; clear wavy boundary.

Bt2—19 to 32 inches; strong brown (7.5YR 5/6) very channery loam; moderate medium subangular blocky structure; friable; few fine roots; 40 percent siltstone channers; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Cr—32 to 42 inches; layered shale and siltstone.

Range of Characteristics

Thickness of the solum: 18 to 36 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Angular and subangular channers of siltstone, sandstone, and shale
Reaction: Unless limed, extremely acid to strongly acid throughout

A horizon:
Hue—10YR
Value—4 or 5

Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 14 percent

BA horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—4 or 5
Texture of the fine-earth fraction—loam or silt loam
Content of rock fragments—10 to 20 percent

Bt horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—4 to 6
Texture of the fine-earth fraction—loam, silt loam, or silty clay loam
Content of rock fragments—10 to 40 percent

C horizon: (if it occurs)
Hue—7.5YR to 2.5Y
Value—3 to 5
Chroma—2 to 6
Texture of the fine-earth fraction—loam, silty clay loam, silty clay, or clay
Content of rock fragments—5 to 20 percent

Hagerstown Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Clayey residuum derived from brown dolomite of the Bisher Formation of the Silurian System (fig. 18)
Slope: 2 to 45 percent
Associated soils: Aaron, Beasley, Caneyville, Crider, and Nicholson
Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Hagerstown silt loam, in an area of Caneyville-Hagerstown-Rock outcrop complex, 12 to 45 percent slopes, eroded, in Lewis County (soil atlas sheet 7); about 1,000 feet southwest of the old Covedale school, 720 feet west of Kentucky Highway 57, and 400 feet south of Crooked Creek Road; USGS Concord Quadrangle; lat. 38 degrees 39 minutes 26 seconds N. and long. 83 degrees 31 minutes 30 seconds W.

A—0 to 4 inches; dark yellowish brown (10YR 4/4) silt loam, yellow (10YR 7/6) dry; few fine and medium distinct strong brown (7.5YR 5/6) soft masses and stains; weak fine subangular blocky structure parting to weak fine granular; friable; common fine and medium roots; neutral; clear smooth boundary.

Bt1—4 to 14 inches; strong brown (7.5YR 5/6) silty clay loam; few medium distinct dark yellowish brown (10YR 4/6) soft masses and stains; moderate medium angular and subangular blocky structure; firm; common fine, medium, and coarse roots; one dolomite stone; many faint clay films on faces of peds and rock fragments; moderately acid; clear smooth boundary.

Bt2—14 to 25 inches; yellowish red (5YR 5/6) clay; strong fine and medium subangular and angular blocky structure; very firm; few fine and coarse roots; 1 percent iron concretions; many distinct clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt3—25 to 34 inches; yellowish red (5YR 5/6) clay; few medium light olive brown (2.5Y 5/6) dolomite stains; strong fine and medium angular and subangular blocky structure; very firm; few fine and coarse roots; one dolomite stone; many distinct clay films on faces of peds and fragments; slightly acid; gradual smooth boundary.

Bt4—34 to 62 inches; yellowish red (5YR 5/6) clay; common fine distinct strong brown (7.5YR 5/8) stains; moderate fine subangular blocky structure; firm; few coarse roots; 2 percent dolomite channers; many distinct clay films on faces of peds and fragments; mildly alkaline.

R—62 inches; hard, yellowish brown (10YR 5/6), coarse grained dolomite.

Range of Characteristics

Thickness of the solum: 40 to 72 inches
Depth to bedrock: 60 to 84 inches
Content of clay in the control section: 35 to 60 percent
Kind of rock fragments: Limestone chert
Reaction: Unless limed, very strongly acid to slightly acid in the upper part of the solum and strongly acid to neutral in the lower part

A horizon:
Hue—10YR to 5YR
Value—3 to 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bt horizon:
Hue—2.5YR to 7.5YR
Value—4 or 5
Chroma—4 to 8

Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Content of rock fragments—0 to 5 percent

C horizon: (if it occurs)
Hue—2.5YR to 10YR
Value—3 to 6
Chroma—4 to 8
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 5 percent

Haymond Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Narrow and moderately wide stream valleys
Position on the landscape: Flood plains
Parent material: Silty, local alluvium derived from limestone, siltstone, shale, and loess of the Quaternary System
Slope: 0 to 3 percent
Associated soils: Melvin, Morehead, Newark, Shelocta, and Skidmore
Taxonomic class: Coarse-silty, mixed, mesic Dystric Fluventic Eutrochrepts

Typical Pedon

Haymond silt loam, frequently flooded, in Lewis County (soil atlas sheet 32); 1.4 miles northeast of the junction of Kentucky Highway 59 and Kentucky Highway 1306 at Camp Dix, 1,000 feet southwest of the confluence of Pipe Lick Creek and Kinniconick Creek, and 50 feet southeast of Kentucky Highway 1306; USGS Head of Grassy Quadrangle; lat. 38 degrees 28 minutes 05 seconds N. and long. 83 degrees 15 minutes 40 seconds W.

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; many fine roots; neutral; clear smooth boundary.
Bw1—6 to 22 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.
Bw2—22 to 43 inches; yellowish brown (10YR 5/6) silt loam; weak thin platy structure; very friable; few fine roots; common distinct yellowish brown (10YR 5/4) silt coatings on faces of peds; moderately acid; gradual smooth boundary.
Bw3—43 to 65 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; few distinct yellowish brown (10YR 5/4) silt coatings on faces of peds; moderately acid; gradual smooth boundary.
C—65 to 95 inches; yellowish brown (10YR 5/6) silt loam; massive; friable; few distinct yellowish brown (10YR 5/4) silt coatings on faces of peds; slightly acid.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: Less than 18 percent
Reaction: Moderately acid to slightly alkaline in the solum and slightly acid to slightly alkaline in the substratum

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—loam or silt loam

Bw horizon:
Hue—10YR
Value—4 or 5
Chroma—4 or 6
Texture of the fine-earth fraction—silt loam

C horizon:
Hue—10YR
Value—4 or 5
Chroma—4 or 6
Texture of the fine-earth fraction—sandy loam, loam, or silt loam

Kinnick Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Stream valleys
Landscape position: Flood plains
Parent material: Loamy, local alluvium derived from limestone, siltstone, and shale of the Quaternary System
Slope: 0 to 3 percent
Associated soils: Boonesboro, Melvin, Newark, Nolin, Sees, Skidmore, and Woolper
Taxonomic class: Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts

Typical Pedon

Kinnick silt loam, occasionally flooded, in Lewis County (soil atlas sheet 14); about 1.3 miles west of Valley School, 1.09 miles east of Clarksburg, 200 feet north-northwest of the confluence of Big Sulphur Branch and Salt Lick Creek, and 20 feet west of a

gravel road; USGS Charters Quadrangle; lat. 38 degrees 35 minutes 02 seconds N. and long. 83 degrees 23 minutes 54 seconds W.

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; very friable; many fine roots; moderately acid; clear smooth boundary.

Bw1—9 to 21 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; common fine roots; moderately acid; gradual smooth boundary.

Bw2—21 to 31 inches; yellowish brown (10YR 5/4) silt loam; common faint pale brown (10YR 6/3) and common fine distinct strong brown (7.5YR 5/6) lithochromic mottles; weak fine and medium subangular blocky structure; friable; few fine roots; moderately acid; gradual smooth boundary.

BC—31 to 55 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few fine and coarse roots; moderately acid; clear smooth boundary.

C1—55 to 73 inches; yellowish brown (10YR 5/6) silt loam; massive; friable; few fine roots; few fine prominent light brownish gray (2.5Y 6/2) iron depletions and common fine distinct strong brown (7.5YR 5/6) soft masses in which iron has accumulated; moderately acid; clear smooth boundary.

C2—73 to 76 inches; yellowish brown (10YR 5/6) gravelly silt loam; massive; friable; many fine distinct strong brown (7.5YR 5/6) soft masses in which iron has accumulated and many fine prominent light brownish gray (2.5Y 6/2) iron depletions; 30 percent rounded quartz gravel; strongly acid.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Quartz gravel
Reaction: Moderately acid to moderately alkaline in the solum and strongly acid to moderately alkaline in the substratum.

Ap horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bw horizon:
Hue—7.5YR to 2.5Y
Value—4 or 5
Chroma—3 to 6
Redoximorphic features—shades of brown and gray below a depth of 24 inches
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

BC horizon:
Hue—7.5YR to 2.5Y
Value—4 or 5
Chroma—2 to 6
Redoximorphic features—shades of gray and brown
Texture of the fine-earth fraction—silt loam, loam, or silty clay loam
Content of rock fragments—0 to 5 percent

C horizon:
Hue—7.5YR to 2.5Y
Value—4 or 5
Chroma—2 to 6
Redoximorphic features—shades of gray and brown
Texture of the fine-earth fraction—silt loam, loam, or silty clay loam
Content of rock fragments—0 to 30 percent

Lakin Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform: Ohio River valley
Landscape position: Terraces and some upland side slopes
Parent material: Fine textured and medium textured eolian sand and nonlocal alluvium of the Quaternary System
Slope: 2 to 35 percent
Associated soils: Ashton, Chavies, Otwell, and Wheeling
Taxonomic class: Mixed, mesic Argic Udipsamments

Typical Pedon

Lakin loamy sand, 2 to 8 percent slopes, in Lewis County (soil atlas sheet 6); about 1.6 miles south of Sandhill, about 150 feet west of Sandhill Road, and about 100 feet southeast of the CSX Railroad tracks; USGS Maysville East Quadrangle; lat. 38 degrees 39 minutes 06 seconds N. and long. 83 degrees 37 minutes 55 seconds W.

Ap—0 to 12 inches; brown (10YR 4/3) loamy sand, brown (10YR 5/3) dry; weak fine granular structure

and single grain; very friable; common fine roots; moderately alkaline; abrupt smooth boundary.

E and Bt1—12 to 21 inches; yellowish brown (10YR 5/6) sand; single grain; weak fine and medium subangular blocky structure in lamellae; very friable; strong brown (7.5YR 4/6) very wavy and semicontinuous lamellae of fine sandy loam; moderately alkaline; clear smooth boundary.

E and Bt2—21 to 32 inches; yellowish brown (10YR 5/6) sand; single grain; weak fine and medium subangular blocky structure in lamellae; very friable; strong brown (7.5YR 4/6) wavy semicontinuous lamellae of fine sandy loam; moderately alkaline; clear smooth boundary.

E and Bt3—32 to 54 inches; brownish yellow (10YR 6/6) sand; coated and uncoated sand grains, 40 percent uncoated; single grain; weak fine and medium subangular blocky structure in lamellae; very friable; dark yellowish brown (10YR 4/6) wavy continuous lamellae of fine sandy loam; moderately alkaline; abrupt smooth boundary.

E and Bt4—54 to 58 inches; brownish yellow (10YR 6/6) loamy sand; coated and uncoated sand grains; single grain; weak fine and medium subangular blocky structure in lamellae; very friable; yellowish brown (10YR 5/6) wavy continuous lamellae of fine sandy loam; moderately alkaline; abrupt smooth boundary.

E and Bt5—58 to 96 inches; brownish yellow (10YR 6/6) sand; coated and uncoated sand grains, 50 percent uncoated; single grain; weak fine and medium subangular blocky structure in lamellae; very friable; dark yellowish brown (10YR 4/6) lamellae of sandy loam; moderately alkaline.

Range of Characteristics

Thickness of the solum: 40 to 80 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: Less than 18 percent
Kind of rock fragments: Round gravel and quartzite pebbles
Depth to uppermost lamellae: 10 to 20 inches
Reaction: Unless limed, very strongly acid to moderately acid

Ap horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture of the fine-earth fraction—loamy sand
Content of rock fragments—0 to 3 percent

E part of Bt horizon:
Hue—5YR to 10YR
Value—4 to 6
Chroma—4 to 6
Texture of the fine-earth fraction—loamy fine sand, loamy sand, fine sand, or sand
Content of rock fragments—0 to 3 percent

Bt part of Bt horizon:
Hue—5YR to 10YR
Value—3 to 5
Chroma—3 to 6
Texture of the fine-earth fraction—loamy fine sand, loamy sand, fine sand, sand, sandy loam, or fine sandy loam
Content of rock fragments—0 to 3 percent

C horizon: (if it occurs)
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture of the fine-earth fraction—loamy sand or sand
Content of rock fragments—0 to 15 percent

Lawrence Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate above the fragipan and slow and moderately slow in and below the fragipan
Landform: Uplands and river and stream valleys
Position on the landscape: Broad, flat ridgetops and stream terraces
Parent material: Silty material over calcareous shales and dolomite of the Upper Crab Orchard Formation of the Silurian System on uplands and silty alluvium of the Quaternary System on stream terraces
Slope: 0 to 4 percent
Associated soils: Aaron, Ashton, Beasley, McGary, Melvin, Morehead, Nicholson, and Shrouts
Taxonomic class: Fine-silty, mixed, mesic Aquic Fragiudalfs

Typical Pedon

Lawrence silt loam, in Lewis County (soil atlas sheet 25); about 2.0 miles southeast of the junction of Kentucky Highway 10 and Simmons Road at Tollesboro, about 700 feet west of the junction of Simmons Road and Ribolt-Epworth Road, and about 250 feet northwest of the fence along Ribolt-Epworth Road; USGS Tollesboro Quadrangle; lat. 38 degrees 32 minutes 13 seconds N. and long. 83 degrees 32 minutes 42 seconds W.

Ap—0 to 9 inches; light olive brown (2.5Y 5/4) silt loam, pale yellow (2.5Y 8/3) dry; moderate medium subangular blocky structure parting to moderate fine granular; friable; common fine roots; common fine yellowish brown (10YR 5/8) stains on peds; neutral; abrupt wavy boundary.

Bt1—9 to 19 inches; brownish yellow (10YR 6/6), light brownish gray (2.5Y 6/2), and pale brown (10YR 6/3) silt loam; moderate fine and medium subangular blocky structure; firm; few fine roots; few very faint clay films in pores; common fine distinct strong brown (7.5YR 5/8) masses in which iron has accumulated; very strongly acid; clear wavy boundary.

Btx1—19 to 27 inches; pale brown (10YR 6/3) and olive yellow (2.5Y 6/6) silt loam; moderate very coarse prismatic structure parting to strong medium subangular and angular blocky; very firm; few fine roots between prisms, measured at 6 inches apart; few very faint clay films in pores; few fine distinct strong brown (7.5YR 5/8) masses in which iron has accumulated; many medium and coarse light brownish gray (2.5Y 6/2) iron depletions, drying to white (10YR 8/1); estimated 10 percent very fine rounded gravel or iron concretions; very strongly acid; gradual wavy boundary.

Btx2—27 to 44 inches; light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) silt loam; strong very coarse prismatic structure parting to strong medium and coarse subangular and angular blocky; very firm and brittle; few fine roots between prisms, measured at 6 inches apart; few very faint clay films in pores; many medium distinct yellowish brown (10YR 5/6) masses in which iron has accumulated; light gray (10YR 7/1) iron depletions, drying to gray (10YR 6/1); estimated 10 percent very fine rounded gravel or iron concretions; very strongly acid; clear wavy boundary.

2Bt2—44 to 51 inches; light yellowish brown (2.5Y 6/4) and brownish yellow (10YR 6/8) silt loam; moderate fine and medium angular and subangular blocky structure; very firm; one fine root; common faint clay films in pores and on faces of peds; many medium faint light brownish gray (2.5Y 6/2) iron depletions, drying to white (10YR 8/1); few fine distinct pale olive (5Y 5/3) masses in which iron has accumulated; estimated 1 percent ironstone channers; very strongly acid; gradual smooth boundary.

2C—51 to 61 inches; greenish gray (5GY 5/1), light yellowish brown (2.5Y 6/4), and olive yellow (2.5Y 6/8) clay; massive with relict shale structure; very firm; few fine roots; a thin layer of ironstone at the top of boundary; strongly acid; clear smooth boundary.

2Cr—61 to 64 inches; olive (5Y 4/4), layered, calcareous clay shale; very firm; neutral.

Range of Characteristics

Thickness of the solum: 40 to 80 inches
Depth to bedrock: More than 60 inches
Depth to fragipan: 18 to 26 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Chert or rounded gravel
Reaction: Unless limed, very strongly acid to slightly acid above the fragipan, very strongly acid or strongly acid in the fragipan, and very strongly acid to neutral below the fragipan

Ap horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 3 percent

Bt horizon:
Hue—7.5YR to 2.5Y
Value—5 or 6
Chroma—3 to 7
Redoximorphic features—shades of gray, brown, or olive
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 3 percent

Btx horizon:
Hue—7.5YR to 5Y
Value—4 to 6
Chroma—1 to 8
Redoximorphic features—shades of gray, brown, or olive
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 3 percent

2Bt horizon: (if it occurs)
Hue—5YR to 5Y
Value—4 to 6
Chroma—1 to 8
Redoximorphic features—shades of gray, brown, or olive
Texture of the fine-earth fraction—silt loam, silty clay loam, silty clay, or clay

2C horizon:
Hue—GY, 2.5Y, or 5Y; or is neutral
Value—5 to 7

Chroma—0 to 8
Redoximorphic features—shades of gray, brown, or olive
Texture—silt loam, silty clay loam, silty clay, or clay

McGary Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow or very slow
Landform: Uplands
Landscape position: Broad, flat ridgetops
Parent material: Silty and clayey alluvium of the Quaternary System and silty and clayey material over calcareous shale and dolomite of the Upper Crab Orchard Formation of the Silurian System
Slope: 1 to 4 percent
Associated soils: Aaron, Beasley, and Lawrence
Taxonomic class: Fine, mixed, mesic Aeric Epiaqualfs

Typical Pedon

McGary silt loam, in Lewis County (soil atlas sheet 7); about 2.1 miles northeast of Fearisville, about 1.0 mile southeast of Hymes Knob, about 280 feet west of Kentucky Highway 1443, and about 110 feet south of a drain; USGS Manchester Islands Quadrangle; lat. 38 degrees 38 minutes 08 seconds N. and long. 83 degrees 33 minutes 45 seconds W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—10 to 14 inches; brownish yellow (10YR 6/6) silty clay loam; weak medium and fine subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; common fine faint light brownish gray (10YR 6/2) iron depletions and many fine distinct pale brown (10YR 6/3) masses in which iron has accumulated; moderately acid; clear smooth boundary.

Bt2—14 to 23 inches; brownish yellow (10YR 6/6) silty clay loam; moderate medium subangular blocky structure; firm; many faint clay films on faces of peds; many medium faint light gray (10YR 7/1) iron depletions and few fine and medium distinct strong brown (7.5YR 5/6) masses in which iron has accumulated; moderately acid; gradual smooth boundary.

Btg—23 to 36 inches; light brownish gray (10YR 6/2) and brownish yellow (10YR 6/6) silty clay; many fine and medium faint light gray (10YR 7/1) iron depletions and many fine to coarse distinct strong brown (7.5YR 5/8) masses in which iron has accumulated; moderate medium subangular blocky structure; firm; many faint and distinct clay films on faces of peds; moderately acid; gradual smooth boundary.

C—36 to 61 inches; brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) clay; massive with minor platy structure; firm; many medium and coarse manganese and iron concretions in a 4-inch-thick layer that begins at a depth of 48 inches; many faint clay films and coatings on faces of peds; many medium and coarse faint light gray (10YR 7/1) iron depletions; neutral; clear smooth boundary.

Cr—61 inches; layered, calcareous shale in shades of olive, gray, and green.

Range of Characteristics

Thickness of the solum: 24 to 40 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 35 to 60 percent
Reaction: Slightly acid or neutral in the surface layer, moderately acid or slightly acid in the B horizon, and neutral to moderately alkaline in the C horizon

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—3
Texture of the fine-earth fraction—silt loam or silty clay loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Redoximorphic features—shades of gray, brown, and yellow
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay

Cg horizon (if it occurs) or C horizon:
Hue—10YR
Value—4 or 6
Chroma—2 to 6
Redoximorphic features—shades of gray, olive, and green
Texture of the fine-earth fraction—stratified silt loam, silty clay loam, silty clay, or clay

Melvin Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: River and stream valleys
Landscape position: Flood plains

Parent material: Mixed alluvium derived from limestone, siltstone, and shale of the Quaternary System
Slope: 0 to 2 percent
Associated soils: Haymond, Kinnick, Lawrence, McGary, Morehead, Newark, Nolin, Sees, and Skidmore
Taxonomic class: Fine-silty, mixed, mesic Typic Fluvaquents

Typical Pedon

Melvin silt loam, frequently flooded, in Lewis County (soil atlas sheet 30); about 1.2 miles southeast of the junction of Kentucky Highway 989 and Buck Lick Branch Road at Burtonville, and about 400 feet north of Buck Lick Road; USGS Burtonville Quadrangle; lat. 38 degrees 28 minutes 58 seconds N. and long. 83 degrees 33 minutes 35 seconds W.

Ap—0 to 7 inches; light brownish gray (2.5Y 6/2) and gray (5Y 6/1) silt loam, white (2.5Y 5/1) dry; weak fine granular structure; friable; many fine and few coarse roots; many fine and medium prominent yellowish red (5YR 5/6) masses in which iron has accumulated; moderately acid; gradual smooth boundary.
Bg—7 to 21 inches; gray (5Y 6/1) silt loam; weak fine subangular blocky structure; friable; common fine roots; many medium and coarse and common fine prominent reddish yellow (7.5YR 6/8) masses in which iron has accumulated; moderately acid; diffuse smooth boundary.
Cg1—21 to 40 inches; gray (10YR 6/1 and 5Y 6/1) silt loam; structureless; friable; common fine and few medium roots; many fine black concretions and iron stains; many medium and coarse faint brownish yellow (10YR 6/8) masses in which iron has accumulated; moderately acid; diffuse smooth boundary.
Cg2—40 to 70 inches; gray (10YR 6/1) silt loam; structureless; friable; few fine roots; common medium faint brownish yellow (10YR 6/8) masses in which iron has accumulated; slightly acid.

Range of Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Reaction: Moderately acid to mildly alkaline throughout

Ap horizon:
Hue—10YR or 5Y
Value—4 or 5
Chroma—1 to 3
Redoximorphic features—shades of red and brown
Texture of the fine-earth fraction—silt loam

Bg horizon:
Hue—10YR or 5Y
Value—5 or 6
Chroma—1 or 2
Redoximorphic features—shades of red and brown
Texture of the fine-earth fraction—silt loam or silty clay loam

Cg horizon:
Hue—10YR to 5Y
Value—5 or 6
Chroma—1 or 2
Redoximorphic features—shades of red, brown, yellow, or gray
Texture of the fine-earth fraction—silt loam or silty clay loam

Morehead Series

Depth class: Very deep
Drainage class: Moderately well drained and somewhat poorly drained
Permeability: Moderate
Landform: River and stream valleys
Landscape position: Low terraces, alluvial fans, and footslopes
Parent material: Mixed, local and nonlocal alluvium derived from limestone, siltstone, and shale of the Quaternary System
Slope: 0 to 4 percent
Associated soils: Ashton, Chavies, Haymond, Lawrence, Melvin, Otwell, Sees, and Wheeling
Taxonomic class: Fine-silty, mixed, mesic Aquic Hapludults

Typical Pedon

Morehead silt loam, rarely flooded, in Lewis County (soil atlas sheet 40); about 1.0 mile south of Head of Grassy, 0.8 mile south of the confluence of Old Trace Creek and Grassy Fork, 400 feet east of Grassy Fork, and 20 feet north of the boundary fence; USGS Head of Grassy Quadrangle; lat. 38 degrees 22 minutes 34 seconds N. and long. 83 degrees 15 minutes 41 seconds W.

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine granular structure; friable; many fine roots; 2 percent quartz gravel; very strongly acid; clear smooth boundary.

Bt1—9 to 18 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; common fine roots; 5 percent quartz gravel; common faint clay films on faces of peds; few fine distinct pale brown (10YR 6/3) masses in which iron has accumulated; very strongly acid; clear smooth boundary.

Bt2—18 to 32 inches; yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; friable; 5 percent quartz gravel; many faint clay films on faces of peds; many fine distinct pale brown (10YR 6/3) masses in which iron has accumulated; light brownish gray (10YR 6/2) iron depletions; very strongly acid; gradual smooth boundary.

Bt3—32 to 42 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular and angular blocky structure; firm; 8 percent quartz gravel; many fine distinct clay films on faces of peds; many medium distinct pale brown (10YR 6/3) masses in which iron has accumulated; light brownish gray (10YR 6/2) iron depletions; very strongly acid; gradual smooth boundary.

C—42 to 62 inches; yellowish brown (10YR 5/6), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) silty clay; moderate thin platy structure; firm; very strongly acid.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Quartz gravel
Reaction: Unless limed, very strongly or strongly acid throughout

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bt horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—5 or 6
Redoximorphic features—shades of brown or gray
Texture of the fine-earth fraction—silt loam and silty clay loam
Content of rock fragments—0 to 10 percent

C horizon:
Hue—10YR
Value—5 or 6
Chroma—2 to 6
Redoximorphic features—shades of gray or brown
Texture of the fine-earth fraction—silt loam, silty clay loam, or silty clay
Content of rock fragments—0 to 10 percent

Newark Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: River and stream valleys
Landscape position: Flood plains
Parent material: Mixed alluvium derived from limestone, siltstone, shale, and loess of the Quaternary System
Slope: 0 to 3 percent
Associated soils: Haymond, Kinnick, Melvin, Nolin, Sees, Shelocta, Skidmore, and Woolper
Taxonomic class: Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents

Typical Pedon

Newark silt loam, occasionally flooded, in Lewis County (soil atlas sheet 20); about 2.0 miles southwest of Charters, 1.6 miles north of the old Haselton School, 1,200 feet east of the mouth of Ginn Hollow, and 600 feet northwest of Big Branch; USGS Charters Quadrangle; lat. 38 degrees 33 minutes 00 seconds N. and long. 83 degrees 27 minutes 27 seconds W.

Ap—0 to 8 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) silt loam, very pale brown (10YR 7/3) dry; weak fine granular structure; friable; many fine roots; neutral; gradual smooth boundary.

Bw—8 to 15 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; firm; common fine roots; many medium pale brown (10YR 6/3) and common fine and medium faint light brownish gray (10YR 6/2) iron depletions; slightly acid; clear smooth boundary.

Bg—15 to 26 inches; light brownish gray (10YR 6/2) silt loam; weak medium subangular blocky structure; firm; few fine roots; many medium and coarse faint yellowish brown (10YR 5/6) masses in which iron has accumulated; moderately acid; gradual smooth boundary.

Cg—26 to 43 inches; light brownish gray (10YR 6/2) silt loam; massive; firm; common fine and medium faint yellowish brown (10YR 5/6) masses in which iron has accumulated; moderately acid; abrupt smooth boundary.

C—43 to 62 inches; brown (10YR 4/3) very gravelly silt loam; massive; friable; 45 percent rounded gravel;

many fine and medium light brownish gray (10YR 6/2) iron depletions; moderately acid.

Range of Characteristics

Thickness of the solum: 20 to 50 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Quartz gravel
Reaction: Moderately acid to mildly alkaline throughout

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bw horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Redoximorphic features—shades of brown, yellow, or gray
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

Bg horizon:
Hue—10YR
Value—4 to 6
Chroma—0 to 2
Redoximorphic features—shades of brown, yellow, or gray
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

Cg horizon:
Hue—10YR
Value—5 to 7
Chroma—0 to 2
Redoximorphic features—shades of brown, yellow, or gray
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 10 percent

C horizon: (if it occurs)
Hue—2.5Y to 7.5YR
Value—4 to 7
Chroma—2 to 4
Redoximorphic features—shades of brown, yellow, or gray
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 60 percent

Nicholson Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Silty material underlain by clayey residuum derived from limestones, dolomitic limestones, siltstones, and calcareous shales of the Ordovician and Silurian Systems
Slope: 2 to 12 percent
Associated soils: Aaron, Beasley, Crider, Hagerstown, and Lawrence
Taxonomic class: Fine-silty, mixed, mesic Oxyaquic Fragiudalfs

Typical Pedon

Nicholson silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 7); about 2.7 miles east-northeast of Hymes Knob, 1.38 miles south-southeast of the intersection of Kentucky Highway 57 and Crooked Creek Road, and 0.6 mile west-northwest of Covedale; USGS Manchester Islands Quadrangle; lat. 38 degrees 39 minutes 46 seconds N. and long. 83 degrees 31 minutes 50 seconds W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; neutral; clear wavy boundary.
Bt1—8 to 18 inches; yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; common fine distinct pale brown (10YR 6/3) iron depletions; neutral; clear smooth boundary.
Bt2—18 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; many faint clay films on faces of peds; many fine and medium distinct gray (10YR 6/2) and pale brown (10YR 6/3) iron depletions; very strongly acid; clear smooth boundary.
Btx1—24 to 34 inches; strong brown (7.5YR 5/6) silty clay loam; weak coarse prismatic structure; very firm; many distinct silt coatings and clay films on faces of peds; many medium and coarse prominent light gray (10YR 7/1) iron depletions; very strongly acid; gradual smooth boundary.
Btx2—34 to 42 inches; brownish yellow (10YR 5/6) silty clay loam; moderate coarse prismatic structure; very firm; many medium manganese concretions; many distinct silt coatings and clay films on faces of peds; slightly acid; clear smooth boundary.

2C—42 to 61 inches; yellowish brown (10YR 5/6) silty clay; very firm; 3 percent dolomite gravel; mildly alkaline; abrupt smooth boundary.
2R—61 inches; hard dolomite.

Range of Characteristics

Thickness of the solum: 40 to 80 inches
Depth to bedrock: More than 60 inches
Depth to the fragipan: 20 to 30 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Quartz and dolomite gravel
Reaction: Unless limed, very strongly acid to slightly acid through the fragipan and strongly acid to mildly alkaline below the fragipan

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture of the fine-earth fraction—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—4 to 6
Redoximorphic features—shades of gray and brown
Texture of the fine-earth fraction—silt loam or silty clay loam

Btx horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 to 6
Redoximorphic features—shades of gray, brown, or yellow
Texture of the fine-earth fraction—silt loam or silty clay loam

2C horizon:
Hue—5YR to 2.5Y
Value—4 to 6
Chroma—4 to 8
Redoximorphic features—shades of gray, brown, or olive
Texture of the fine-earth fraction—silty clay loam or silty clay
Content of rock fragments—0 to 10 percent

Nolin Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Ohio River valley
Landscape position: Flood plains
Parent material: Loamy, nonlocal alluvium derived from limestone, siltstone, and shale of the Quaternary System
Slope: 0 to 3 percent
Associated soils: Melvin, Newark, and Woolper
Taxonomic class: Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts

Typical Pedon

Nolin silt loam, occasionally flooded, in Lewis County (soil atlas sheet 2); on Manchester Island No. 2; USGS Manchester Islands Quadrangle; lat. 38 degrees 41 minutes 10 seconds N. and long. 83 degrees 35 minutes 23 seconds W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; common fine and medium roots; moderately acid; gradual smooth boundary.
Bw1—7 to 44 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; moderately acid; diffuse smooth boundary.
Bw2—44 to 60 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine and medium roots; many faint silt coatings on faces of peds; slightly acid; clear smooth boundary.
C—60 to 65 inches; brown (10YR 4/3) silt loam; massive; friable; slightly acid.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Quartz gravel
Reaction: Moderately acid to moderately alkaline in the solum and strongly acid to moderately alkaline in the substratum

A horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bw horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

C horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 30 percent

Otwell Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Very slow
Landform: River and stream valleys
Landscape position: Terraces
Parent material: Old, mixed, local and nonlocal alluvium derived from limestone, siltstone, shale, and sandstone in the uplands; Quaternary System
Slope: 2 to 12 percent
Associated soils: Ashton, Chavies, Elk, Lakin, Morehead, Shelocta, and Wheeling
Taxonomic class: Fine-silty, mixed, mesic Oxyaquic Fragiudalfs

Typical Pedon

Otwell silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 3); about 3.1 miles northwest of the junction of Kentucky Highway 57 and Kentucky Highway 8 at Concord, 0.33 mile north of Kentucky Highway 8, and 300 feet north of the CSX Railroad tracks; USGS Manchester Islands Quadrangle; lat. 38 degrees 41 minutes 45 seconds N. and long. 83 degrees 33 minutes 25 seconds W..

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, very pale brown (10YR 7/4) dry; weak fine granular structure; very friable; few fine roots; 5 percent quartz gravel and pebbles; slightly acid; clear smooth boundary.

BA—9 to 15 inches; yellowish brown (10YR 5/4) and dark grayish brown (10YR 4/2) silt loam, very pale brown (10YR 7/4) dry; weak fine subangular blocky and granular structure; friable; few fine roots; moderately acid; clear smooth boundary.

Bt1—15 to 23 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—23 to 29 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; firm; few fine roots; many faint clay films on faces of peds; common fine faint pale brown (10YR 6/3) iron depletions; very strongly acid; abrupt wavy boundary.

Btx1—29 to 40 inches; yellowish brown (10YR 5/4) silt loam strong coarse prismatic structure; brittle; few medium dark yellowish brown (10YR 4/4) manganese stains; many medium and coarse faint gray (10YR 6/1) and many medium faint pale brown (10YR 6/3) iron depletions and common fine faint yellowish brown (10YR 5/8) masses of iron accumulations; strongly acid; gradual smooth boundary.

Btx2—40 to 65 inches; dark yellowish brown (10YR 4/6) silt loam; strong very coarse prismatic structure; brittle; common medium dark yellowish brown (10YR 4/4) manganese stains; many medium and coarse faint pale brown (10YR 6/3) and gray (10YR 6/1) iron depletions and common fine faint yellowish brown (10YR 5/8) masses of iron accumulations; strongly acid.

Range of Characteristics

Thickness of the solum: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Depth to fragipan: 20 to 30 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Quartz gravel
Reaction: Unless limed, very strongly acid to neutral in the surface horizon and very strongly acid or strongly acid in the subsoil and substratum

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

BA horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bt horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—4 to 8
Redoximorphic features—shades of gray and brown at a depth of more than 10 inches
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

Btx horizon:
Hue—10YR
Value—5 or 6
Chroma—2 to 6

Redoximorphic features—shades of gray and brown
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

C horizon: (if it occurs)
Hue—10YR or 2.5Y
Value—5 to 7
Chroma—2 to 4
Redoximorphic features—shades of gray and brown
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 10 percent

Sees Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Landform: Stream valleys
Landscape position: Footslopes, toeslopes, and terraces
Parent material: Mixed alluvium and colluvium derived from limestone and calcareous shale of the Quaternary System
Slope: 2 to 4 percent
Associated soils: Kinnick, Melvin, Morehead, Newark, and Woolper
Taxonomic class: Fine, mixed, mesic Aquollic Hapludalfs

Typical Pedon

Sees silt loam, 2 to 4 percent slopes, occasionally flooded, in Lewis County (soil atlas sheet 20); about 2.8 miles southwest of Charters, 1.1 miles north of the old Haselton School, 1,280 feet west of Big Branch, and 100 feet north of a dirt road in Killfillian Hollow; USGS Charters Quadrangle; lat. 38 degrees 32 minutes 38 seconds N. and long. 83 degrees 28 minutes 12 seconds W.

A—0 to 15 inches; dark brown (10YR 3/3) silt loam, brown (10YR 4/3) dry; moderate fine subangular blocky structure parting to weak fine granular; friable; many fine roots; moderately acid; clear smooth boundary.

Bt1—15 to 30 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; many faint clay films on faces of peds; common fine and medium grayish brown (10YR 5/2) iron depletions; moderately acid; gradual smooth boundary.

Bt2—30 to 40 inches; dark grayish brown (10YR 4/2) silty clay; weak medium subangular blocky structure; firm; few fine roots; 5 percent dolomite fragments and rounded gravel; many distinct clay films on faces of peds; many medium faint gray (10YR 5/1) iron depletions; many fine and medium distinct yellowish brown (10YR 5/4) masses in which iron has accumulated; moderately acid; gradual smooth boundary.

C—40 to 62 inches; yellowish brown (10YR 5/4) and dark grayish brown (10YR 4/2) silty clay; massive common fine and medium distinct gray (10YR 5/1) iron depletions; 10 percent rounded pebbles and dolomite fragments; moderately acid.

Range of Characteristics

Thickness of the solum: 30 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 35 to 60 percent
Kind of rock fragments: Quartz and dolomite gravel
Reaction: Moderately acid to moderately alkaline

A horizon:
Hue—10YR
Value—3
Chroma—1 to 3
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 10 percent

B/A horizon: (if it occurs)
Hue—10YR
Value—3
Chroma—2 or 3
Texture of the fine-earth fraction—silty clay loam
Content of rock fragments—0 to 10 percent

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Redoximorphic features—shades of gray and brown
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Content of rock fragments—0 to 10 percent

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Redoximorphic features—shades of gray and brown
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 10 percent

Shelocta Series

Depth class: Deep and very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Uplands and stream valleys
Landscape position: Side slopes, footslopes, and benches
Parent material: Mixed colluvium derived from shale, sandstone, and siltstone of the Mississippian System
Slope: 2 to 65 percent
Associated soils: Berks, Blairton, Brownsville, Covedale, Elk, Gilpin, Haymond, Newark, Otwell, and Skidmore
Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludults

Typical Pedon

Shelocta silt loam, 20 to 45 percent slopes, eroded, in Lewis County (soil atlas sheet 32); about 2.8 miles southwest of Camp Dix, 1.6 miles west of the confluence of Mosby Creek and Straight Fork Creek, 480 feet northwest of the confluence of Brandy Fork and Mosby Creek; USGS Head of Grassy Quadrangle; lat. 38 degrees 28 minutes 45 seconds N. and long. 83 degrees 21 minutes 57 seconds W.

A—0 to 4 inches; brown (10YR 4/3) silt loam, very pale brown (10YR 8/4) dry; weak fine granular structure; very friable; many fine and common medium roots; 10 percent sandstone gravel; moderately acid; clear wavy boundary.
E—4 to 8 inches; yellowish brown (10YR 5/4) silt loam, very pale brown (10YR 8/4) dry; weak fine subangular blocky structure parting to weak fine granular; very friable; common fine and medium roots; 10 percent sandstone gravel; very strongly acid; clear wavy boundary.
Bt1—8 to 15 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak fine subangular blocky structure; friable; common fine and medium roots, few coarse roots; 15 percent sandstone gravel; common faint clay films on faces of peds; very strongly acid; clear wavy boundary.
Bt2—15 to 23 inches; yellowish brown (10YR 5/8) silt loam; moderate fine and medium subangular blocky structure; firm; few fine roots; 5 percent sandstone gravel; many distinct clay films on faces of peds and fragments; very strongly acid; gradual smooth boundary.
Bt3—23 to 28 inches; strong brown (7.5YR 5/8) loam; moderate medium subangular and angular blocky structure; firm; few fine roots; 8 percent sandstone and siltstone gravel; many distinct clay films on faces of peds and fragments; very strongly acid; gradual smooth boundary.
Bt4—28 to 36 inches; strong brown (7.5YR 5/8) loam; moderate fine and medium angular blocky structure; firm; few fine roots; 13 percent sandstone and siltstone gravel; many distinct clay films on faces of peds; very strongly acid; clear smooth boundary.
Bt5—36 to 50 inches; strong brown (7.5YR 5/8) very gravelly loam; moderate fine and medium subangular blocky structure; firm; few fine roots; 50 percent sandstone and siltstone gravel; many distinct clay films on faces of peds; very strongly acid.
Cr—50 inches; layered siltstone over sandstone.

Range of Characteristics

Thickness of the solum: More than 60 inches
Depth to bedrock: More than 40 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Sandstone, siltstone, and shale gravel
Reaction: Unless limed, very strongly acid or strongly acid throughout

A horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—10 to 25 percent

E horizon:
Hue—10YR
Value—5 or 6
Chroma—4 to 6
Texture of the fine-earth fraction—silt loam
Content of rock fragments—10 to 20 percent

Bt horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—4 to 8
Texture of the fine-earth fraction—silt loam or loam
Content of rock fragments—5 to 50 percent

C horizon: (if it occurs)
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture of the fine-earth fraction—silt loam or loam
Content of rock fragments—10 to 70 percent

Shrouts Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Very slow
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Clayey residuum derived from calcareous shale interbedded with thin dolomite of the Upper and Lower Crab Orchard Formations of the Silurian System
Slope: 2 to 30 percent
Associated soils: Aaron, Beasley, Covedale, and Lawrence
Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Shrouts silty clay loam, in an area of Shrouts-Beasley complex, 6 to 12 percent slopes, eroded, in Lewis County (soil atlas sheet 19); about 1.2 miles northwest of Happy Hollow Church, 0.9 mile southwest of Ribolt, and 0.4 mile southeast of the confluence of Cabin Creek and Bethel Creek; USGS Tollesboro Quadrangle; lat. 38 degrees 33 minutes 47 seconds N. and long. 83 degrees 31 minutes 47 seconds W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silty clay loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure parting to weak fine granular; friable; many fine and medium roots; neutral; abrupt smooth boundary.
Bt1—3 to 9 inches; light olive brown (2.5Y 5/6) silty clay; common medium prominent gray (10YR 6/1) lithochromic mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; very firm; common fine roots; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; slightly acid; clear smooth boundary.
Bt2—9 to 14 inches; light olive brown (2.5Y 5/6) clay; common medium prominent gray (10YR 6/1) lithochromic mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; very firm; common fine roots; many distinct grayish brown (2.5Y 5/2) clay films on faces of peds; 5 percent shale channers; slightly acid; clear smooth boundary.
Bt3—14 to 20 inches; light olive brown (2.5Y 5/6) and gray (10YR 6/1) clay; moderate coarse prismatic and weak thin relict platy structure; very firm; common fine roots; many distinct grayish brown (2.5Y 5/2) clay films on faces of peds; 10 percent shale channers; moderately alkaline; clear smooth boundary.
C—20 to 30 inches; light olive gray (5Y 6/2) silty clay; weak thin relict platy structure; firm; 10 percent shale channers; moderately alkaline; abrupt smooth boundary.
Cr—30 to 40 inches; light olive gray (5Y 6/2), soft shale; moderately alkaline.

Range of Characteristics

Thickness of the solum: 14 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: 35 to 60 percent
Kind of rock fragments: Shale
Reaction: Strongly acid to moderately alkaline in the solum and neutral to moderately alkaline in the substratum

A horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silty clay loam
Content of rock fragments—0 to 10 percent

Bt horizon:
Hue—10YR to 5Y
Value—5 or 6
Chroma—1 to 6
Lithochromic mottles—shades of gray
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 20 percent

C horizon:
Hue—2.5Y or 5Y
Value—5 to 7
Chroma—1 to 4
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 35 percent

Skidmore Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Stream valleys
Landscape position: Flood plains
Parent material: Mixed local alluvium derived from sandstone, siltstone, and shale of the Quaternary System
Slope: 0 to 4 percent
Associated soils: Haymond, Kinnick, Melvin, Newark, Shelocta, and Woolper
Taxonomic class: Loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts

Typical Pedon

Skidmore gravelly silt loam, occasionally flooded, in Lewis County (soil atlas sheet 21); about 2.0 miles east-southeast of Clarksburg, 1.6 miles south-southwest of Vanceburg, 0.9 mile north-northwest of the junction of Rock Run Road and Kentucky Highway 59, and 0.34 mile south-southwest of the confluence of Appletree Branch and Dry Run Creek; USGS Vanceburg Quadrangle; lat. 38 degrees 34 minutes 00 seconds N. and long. 83 degrees 19 minutes 51 seconds W.

A—0 to 6 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; weak fine granular structure; very friable; many fine, common medium, and few coarse roots; 20 percent sandstone gravel and channers; moderately acid; clear smooth boundary.

Bw1—6 to 24 inches; dark yellowish brown (10YR 4/4) very gravelly loam; weak fine subangular blocky structure; friable; common fine and few medium roots; 50 percent sandstone gravel and channers; moderately acid; clear smooth boundary.

Bw2—24 to 38 inches; dark yellowish brown (10YR 4/4) extremely gravelly loam; weak fine subangular blocky structure; friable; 85 percent sandstone gravel and channers; moderately acid; clear smooth boundary.

C—38 to 72 inches; yellowish brown (10YR 5/4) extremely gravelly loam; massive; friable; 80 percent sandstone gravel and channers; moderately acid.

Range of Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: Less than 35 percent
Kind of rock fragments: Sandstone, siltstone, and limestone gravel and channers.
Reaction: Moderately acid to slightly alkaline throughout

A horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—15 to 35 percent

Bw horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—loam or silt loam
Content of rock fragments—15 to 85 percent

BC horizon: (if it occurs)
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—loam
Content of rock fragments—15 to 85 percent

C horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—loam
Content of rock fragments—60 to 90 percent

Tilsit Series

Depth class: Deep
Drainage class: Moderately well drained
Permeability: Moderate above the fragipan and slow or very slow in and below the fragipan
Landform: Uplands
Landscape position: Ridgetops
Parent material: Silty residuum derived from siltstone, fine grained sandstone, or shale of the Nancy Member of the Borden Formation; Mississippian System
Slope: 2 to 12 percent
Associated soils: Blairton
Taxonomic class: Fine-silty, mixed, mesic Typic Fragiudults

Typical Pedon

Tilsit silt loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 30); about 3.2 miles east-southeast of Burtonville, 0.87 mile north-northwest of Oak Ridge School, 0.83 mile south of Mount Zion Church, 0.56 mile south-southwest of the intersection of Kentucky Highway 3310 and Buck Lick Branch Road, and 800 feet west of Kentucky Highway 3310; USGS Burtonville Quadrangle; lat. 38 degrees 28 minutes 55 seconds N. and long. 83 degrees 30 minutes 48 seconds W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; few medium distinct yellowish brown (10YR 5/6) lithochromic mottles; weak fine granular structure; friable; few fine roots; moderately alkaline; clear smooth boundary.

Bt1—9 to 16 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; moderately alkaline; gradual smooth boundary.

Bt2—16 to 23 inches; light olive brown (2.5Y 5/6) silt loam; moderate fine subangular blocky structure; firm; many faint clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) masses in which iron has accumulated; common fine prominent light brownish gray (10YR 6/2) and pale brown (10YR 6/3) iron depletions; very strongly acid; clear smooth boundary.

Btx1—23 to 31 inches; yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2) silty clay loam; weak medium and coarse prismatic structure; very friable; many distinct clay films between prisms; many medium and coarse distinct light brownish gray (10YR 6/2) iron depletions; 1 percent ironstone channers; very strongly acid; gradual smooth boundary.

Btx2—31 to 43 inches; light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) silty clay loam; moderate coarse prismatic structure; very firm and brittle; many distinct clay films between prisms; 5 percent ironstone channers; very strongly acid.

R—43 inches; hard sandstone.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 40 inches
Depth to the fragipan: 18 to 28 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Sandstone, siltstone, ironstone, and shale
Reaction: Unless limed, extremely acid to strongly acid

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 5 percent

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—4 to 8
Redoximorphic features—shades of brown and gray
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

Btx horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 to 8
Redoximorphic features—shades of brown and gray
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent

Trappist Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Landform: Uplands
Landscape position: Ridgetops and side slopes
Parent material: Clayey residuum derived from black, fissile shale of the Ohio Shale Formation of the Devonian System and the Sunbury Formation of the Mississippian System
Slope: 2 to 60 percent
Associated soils: Colyer and Covedale
Taxonomic class: Clayey, mixed, mesic Typic Hapludults

Typical Pedon

Trappist silt loam, in an area of Covedale-Trappist silt loams, 20 to 55 percent slopes, eroded, in Lewis County (soil atlas sheet 13); about 1.5 miles northeast of Poplar Flat, 240 feet north of Manley Hollow Road, and 100 feet east of a power line; USGS Tollesboro Quadrangle; lat. 38 degrees 36 minutes 42 seconds N. and long. 83 degrees 30 minutes 08 seconds W.

Oe—1 inch to 0; decayed leaf litter.

A—0 to 2 inches; brown (10YR 4/3) silt loam, very pale brown (10YR 7/3) dry; weak fine granular structure; friable; many fine and medium roots; extremely acid; clear smooth boundary.

Bt1—2 to 7 inches; yellowish brown (10YR 5/6) silty clay loam; weak fine subangular blocky structure; firm; common fine and medium and few coarse roots; 2 percent weathered, black, fissile shale channers, crushable; common faint clay films on faces of peds; extremely acid; gradual smooth boundary.

Bt2—7 to 12 inches; yellowish brown (10YR 5/8) silty clay; moderate fine and medium subangular blocky structure; firm; common fine and medium roots; 15 percent weathered, black, fissile shale channers, crushable; many faint clay films on faces of peds; extremely acid; gradual smooth boundary.

Bt3—12 to 20 inches; yellowish brown (10YR 5/6) very channery silty clay; few fine faint pale brown (10YR 6/3) lithochromic mottles; weak fine and medium subangular blocky structure; firm; few fine roots; 35 percent weathered and unweathered, black, fissile shale channers, 50 percent are

crushable; many fine clay films on faces of peds; extremely acid; gradual smooth boundary.

C—20 to 30 inches; yellowish brown (10YR 5/6) very channery clay; common fine distinct strong brown (7.5YR 5/6) and many fine faint yellowish brown (10YR 5/8) lithochromic mottles; weak thin platy structure; firm; few fine roots; 60 percent weathered and unweathered, black, fissile shale, 70 percent is noncrushable; few fine faint clay films and silt coatings on faces of peds and shale channers; extremely acid; clear smooth boundary.

R—30 inches; layered, black (10YR 2/1), fissile shale.

Range of Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of clay in the control section: More than 35 percent
Kind of rock fragments: Black shale
Reaction: Unless limed, extremely acid to strongly acid

A horizon:
Hue—10YR or 2.5Y
Value—3 or 4
Chroma—1 to 4
Texture of the fine-earth fraction—silt loam
Content of rock fragments—0 to 35 percent

Bt horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—4 to 8
Lithochromic mottles—shades of brown, yellow, and red
Texture of the fine-earth fraction—silty clay loam, silty clay, and clay
Content of rock fragments—0 to 35 percent

C horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—4 to 6
Lithochromic mottles—shades of brown, yellow, and red
Texture of the fine-earth fraction—silty clay and clay
Content of rock fragments—35 to 75 percent

Wheeling Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Ohio River valley
Landscape position: Terraces
Parent material: Mixed, nonlocal alluvium on flood plains along the Ohio River; Quaternary System
Slope: 2 to 30 percent
Associated soils: Ashton, Chavies, Lakin, Morehead, and Otwell
Taxonomic class: Fine-loamy, mixed, mesic Ultic Hapludalfs

Typical Pedon

Wheeling loam, 2 to 6 percent slopes, in Lewis County (soil atlas sheet 6); about 2.5 miles east of the intersection of the CSX Railroad tracks and the Mason-Lewis County line, 225 feet north of the CSX Railroad tracks, and 50 feet north of a barn; USGS Maysville East Quadrangle; lat. 38 degrees 40 minutes 09 seconds N. and long. 83 degrees 37 minutes 30 seconds W.

Ap—0 to 9 inches; dark yellowish brown (10YR 3/4) loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; few fine roots; moderately alkaline; clear smooth boundary.

Bt1—9 to 20 inches; dark yellowish brown (10YR 4/6) loam; weak fine subangular blocky structure; friable; common faint clay films on faces of peds and common faint clay bridges between peds; moderately alkaline; gradual smooth boundary.

Bt2—20 to 27 inches; dark yellowish brown (10YR 4/6) sandy clay loam; weak fine and medium subangular blocky structure; friable; many faint clay films on faces of peds; moderately alkaline; clear smooth boundary.

Bt3—27 to 32 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable; many faint clay films on faces of peds; moderately alkaline; clear smooth boundary.

BC—32 to 44 inches; dark yellowish brown (10YR 3/4) fine sandy loam; weak fine granular structure with some single grain; very friable; few faint clay bridges between sand grains; moderately alkaline; clear smooth boundary.

2Bt4—44 to 56 inches; yellowish brown (10YR 5/4) fine sandy loam; common fine faint yellowish brown (10YR 5/8) lithochromic mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; moderately alkaline; clear smooth boundary.

2BC—56 to 58 inches; dark yellowish brown (10YR 4/6) loamy fine sand; weak fine granular structure and single grain; very friable; few faint clay bridges between sand grains; moderately alkaline; clear smooth boundary.

3Bt5—58 to 64 inches; dark yellowish brown (10YR 3/4) fine sandy loam; weak medium subangular

blocky structure; friable; few faint clay films on faces of peds and sand grains; moderately alkaline; clear smooth boundary.

3BC—64 to 69 inches; dark yellowish brown (10YR 3/4) fine sandy loam; weak fine granular structure and single grain; very friable; few faint clay bridges between sand grains; neutral.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: 18 to 35 percent
Kind of rock fragments: Quartz gravel
Reaction: Unless limed, strongly acid or moderately acid throughout

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—3 or 4
Texture of the fine-earth fraction—loam
Content of rock fragments—0 to 5 percent

Bt horizon:
Hue—10YR
Value—3 to 5
Chroma—3 to 6
Texture of the fine-earth fraction—fine sandy loam, sandy clay loam, loam, or silt loam
Content of rock fragments—0 to 5 percent

BC horizon:
Hue—10YR
Value—3 to 5
Chroma—3 to 6
Texture of the fine-earth fraction—sandy loam or fine sandy loam
Content of rock fragments—0 to 20 percent

Woolper Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow to moderately rapid
Landform: Uplands and stream valleys
Landscape position: Footslopes and fans
Parent material: Clayey alluvium and colluvium derived from calcareous shale, dolomite, and limestone of the Silurian and Ordovician Systems
Slope: 2 to 12 percent
Associated soils: Boonesboro, Elk, Fairmount, Faywood, Kinnick, Newark, Sees, and Skidmore
Taxonomic class: Fine, mixed, mesic Typic Argiudolls

Typical Pedon

Woolper silty clay loam, 2 to 6 percent slopes, rarely flooded, in Lewis County (soil atlas sheet 13); about 4.6 miles north of Tollesboro, about 0.4 mile west of Fearisville, about 0.9 mile northeast of the confluence of Cabin Creek and East Fork Cabin Creek, and about 50 feet north of Kentucky Highway 984; USGS Tollesboro Quadrangle; lat. 38 degrees 37 minutes 09 seconds N. and long. 83 degrees 37 minutes 05 seconds W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure parting to moderate medium granular; friable; common fine roots; 10 percent limestone channers; mildly alkaline; clear wavy boundary.

Bt1—10 to 14 inches; dark brown (10YR 3/3) silty clay loam; moderate medium subangular and angular blocky structure; firm; few fine roots; 5 percent limestone channers; common faint clay films on faces of peds; mildly alkaline; clear smooth boundary.

Bt2—14 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular and angular blocky structure; firm; few fine roots; 5 percent limestone channers; many distinct clay films on faces of peds; mildly alkaline; gradual smooth boundary.

Bt3—23 to 35 inches; dark yellowish brown (10YR 4/4) channery silty clay; strong fine and medium subangular blocky structure; firm; 15 percent limestone channers; many distinct clay films on faces of peds; mildly alkaline; clear smooth boundary.

BC—35 to 45 inches; dark yellowish brown (10YR 4/4 and 4/6) very channery clay; weak coarse subangular blocky structure; firm; 35 percent limestone channers; mildly alkaline.

C—45 to 62 inches; olive brown (2.5Y 4/3) channery clay; massive; common faint dark gray (2.5Y 4/1) lithochromic mottles; very firm; 15 percent limestone channers; many distinct clay coatings on faces of peds; mildly alkaline.

Range of Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of clay in the control section: More than 35 percent
Kind of rock fragments: Limestone channers
Reaction: Slightly acid to slightly alkaline

Thickness of the mollic epipedon: 10 to 20 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture of the fine-earth fraction—silty clay loam
Content of rock fragments—0 to 10 percent

Bt horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture of the fine-earth fraction—silty clay loam, silty clay, and clay
Content of rock fragments—0 to 20 percent

BC horizon:
Hue—10YR
Value—4 or 5
Chroma—4 or 6
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 35 percent

C horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—2 to 4
Texture of the fine-earth fraction—silty clay or clay
Content of rock fragments—0 to 15 percent

Formation of the Soils

This section relates the factors of soil formation to the soils of Lewis County and explains the processes of soil differentiation. It also describes the physiography and geology of the county.

Factors of Soil Formation

Soil is a three-dimensional natural body on the Earth's surface consisting of mineral and organic matter that can support plant growth. It is formed through the interaction of the five major factors of soil formation—parent material, climate, plant and animal life, relief, and time (Buol, Hole, and McCracken 1980; Jenny 1941).

Climate and plant and animal life have an effect on parent material that is modified by relief over time. Each factor influences the other four. The relative influence of each factor differs from place to place and determines the varying characteristics of the soils.

All five factors are active in the formation of soils in Lewis County. Theoretically, if the influence or action of these factors were identical at different sites, the soils at these sites would be identical. In reality, one factor may dominate the formation of soil characteristics at one site, while a different factor may dominate at another site. Each factor may modify the effect of the other four.

In Lewis County, climate and plant and animal life are not likely to vary greatly and their influence is relatively constant. Though there are large differences in relief, parent material has been the most influential factor in the formation of soils in the county.

Parent Material

Parent material is the unconsolidated mass in which soil forms. In the early stages of soil formation, a soil has properties similar to those of the parent material. As weathering takes place, these properties are modified and the soil develops its own characteristics. The nature of the parent material affects the rate of weathering, and it also determines the texture and mineral composition of the soil. These properties affect the permeability, shrink-swell potential, and porosity of the soil.

In Lewis County, soils formed in parent material of residuum, colluvium, river and stream alluvium, lacustrine-like deposits, loess, eolian sands, glacial drift and deposits, and slackwater clays. These parent materials have weathered from limestones, sandstones, siltstones, and shales of the Ordovician, Silurian, Devonian, Mississippian, and Pennsylvanian Systems or have been transported in from other areas by wind, water, or, to a minor extent, ice.

Many of the soils on uplands formed in residuum, or materials weathered in place. Examples are the Aaron, Beasley, and Shrouts soils, which formed in material derived from calcareous clay shales and dolomitic limestone of the Silurian System and have a clayey subsoil and substratum. Others, such as the Blairton and Berks soils, formed in materials derived from the silty shales, sandstone, and siltstone of the Mississippian System. These soils have a loamy or loamy-skeletal subsoil and substratum. Colyer and Trappist soils formed in material derived from acid, black, fissile shales of the Devonian System and have a clayey, extremely acid subsoil.

Nicholson, Tilsit, and Crider soils formed in a thin silt or loess mantle over residuum of limestone, sandstone, shale, or other parent material. The upper part of the solum that formed in the loess or silt is silty, and the lower part that formed in the residuum is clayey or loamy.

Brownsville, Shelocta, and other soils on side slopes and at the base of steep slopes formed in colluvium derived from sandstone, siltstone, and shale of the Mississippian and Pennsylvanian Systems. These soils have a loamy subsoil and substratum that have a high content of coarse fragments.

On uplands, McGary and Lawrence soils formed in silty and clayey, lacustrine-like alluvium deposits over calcareous shale. On terraces, McGary soils formed in slackwater clay deposits and Lawrence soils formed in silty alluvium. In these areas, McGary soils are generally silty in the upper part of the subsoil and clayey in the lower part and Lawrence soils are silty throughout the fragipan and clayey below it.

Wheeling, Elk, and Otwell soils formed in older alluvium and older alluvium over glacial deposits on

stream terraces. Boonesboro, Kinnick, Haymond, Newark, and Nolin soils formed in more recent alluvium on flood plains. Lakin soils formed in eolian sand deposits on side slopes and terraces along the Ohio River. All of these soils have less clay in the subsoil and substratum than the soils that formed in residuum.

Some soils formed in colluvium over residuum. They include the Woolper soils on footslopes at the base of steep side slopes. These soils have a clayey subsoil.

Climate

Climatic factors, mainly temperature and rainfall, affect the physical, chemical, and biological properties of soils. Temperature affects the rate of chemical and physical changes in the soils and thus the rate of soil formation. For every 10 degree C increase in temperature, the rate of chemical reaction doubles. Moisture and temperature affect biological reactions. Moisture is essential in soil formation. Climate significantly influences the natural vegetation and animal life. Because of its effect on physical weathering through erosion and deposition, it also influences the relief of an area and the degree of profile development (Buol, Hole, and McCracken 1980).

Changes in climate over long periods affect the soils. Soil formation is affected by the average climatic condition, but extremes in the weather probably have had more influence on particular soil properties than on soil formation. The soils in the survey area formed under a temperate, moist climate that was probably similar to the present day climate. The average annual temperature is 54 degrees F, and the average annual precipitation is 44 inches. Periods of extremely low temperatures during winter are short, and periods of high temperatures in summer are brief. Precipitation is fairly evenly distributed throughout the year.

Because the soils in the survey area are not dry or frozen for long periods, the processes of soil formation are active throughout the year. As water percolates downward through the soil, it leaches soluble bases, including calcium and magnesium, and clay minerals from the upper horizons to the lower horizons or out of the soils. As a result, many soils that formed in material high in content of carbonates and clay minerals are acid and have a loamy surface layer and an accumulation of clay in the subsoil. An example is the Beasley soils.

Plant and Animal Life

The vegetation under which a soil forms influences soil properties, such as color, structure, reaction, and content of organic matter. It extracts water from the soil, recycles nutrients, and adds organic matter to the soil. Gases derived from root respiration combine with water to form acids that influence the weathering of minerals. Organic matter on the surface retards soil erosion and influences soil temperature. Organic matter in the soil helps to improve soil structure, add nutrients, and increase the available water capacity.

Most of the soils in Lewis County formed under, and are still covered by, hardwood forests. These soils are characterized by a thin, dark surface layer and a brighter colored subsoil. Some soils that have a thick, dark surface layer, such as Crider soils, probably formed under grasses, while others, such as Sees and Woolper soils, have a thick, dark surface layer as a result of organic matter being removed from soils on the surrounding side slopes and then redeposited.

Bacteria, fungi, and many other micro-organisms help to decompose organic matter and release nutrients to growing plants. Earthworms, insects, and small burrowing animals mix the soil and create small channels that influence soil aeration and permeability. Earthworms help to incorporate plant residue or other organic matter into the soil.

Changes caused by human activity have been significant. Native forests have been cleared and developed for farming and other uses. Removing timber, cultivating, and overgrazing have accelerated erosion on sloping soils. Wet areas have been drained, new plants have been introduced, and manure, lime, chemical fertilizers, herbicides, and pesticides have been applied in farmed areas. Cultivation has affected soil structure and compaction and lowered the content of organic matter. The development of land for urban uses has significantly influenced the soils in some areas.

Relief

Relief, or the position, shape, and slope of the landscape, affects the formation of soils through its influence on drainage, erosion, plant cover, and soil temperature. Because relief varies widely in the survey area, it accounts for many differences among the soils.

Relief tends to modify the effects of climate and vegetation. For example, Melvin soils, which formed on nearly level flood plains, had an excessive amount of ponded or still water in the profile during formation because they are in landscape positions that do not allow surface water to drain easily and may keep the water table at or near the soil surface. The wetness caused a depletion of the oxygen from the soil by microbial activity, reducing the iron found naturally in the soil, and resulted in the formation of a gray, reduced subsoil. In other nearly level and gently

sloping soils, a fragipan may form under certain conditions, restricting the downward movement of water and forming a gray, reduced subsoil. An example is the Lawrence series.

Gently sloping and sloping soils commonly show most clearly the influence of all five soil-forming factors. Although excess water runs off these soils, erosion is not excessive and enough water moves into and through the soils to cause leaching of bases and the downward movement of clay particles. Since the surface is relatively stable, this downward clay movement formed an argillic horizon. Beasley, Hagerstown, and Shelocta soils are examples.

Some steep soils are shallow and exhibit only slight evidence of profile development because geologic erosion takes place almost as rapidly as soil formation. Fairmount soils are examples. Some sloping soils are deep or very deep because the parent material moves down the slopes slowly and accumulates at the lower end of the slope. Examples are Woolper, Brownsville, Covedale, and Shelocta soils on or below steep and very steep slopes. Other steep and very steep soils are moderately deep because weathering of the underlying rock occurs at a faster rate than geologic erosion. Faywood, Shrouts, Berks, and Caneyville soils are examples.

The soil temperature and plant cover are somewhat different on cool aspects than on warm ones, but these differences are slight and have been altered by past and current timber harvesting and farming practices.

Time

The time required for a soil to form depends on the other soil-forming factors. Less time is required for a soil to form in a warm, moist climate than in a cool, dry climate. Also, some parent material is more resistant to weathering than others. For example, quartz sand may change very little even if it is exposed for long periods. Other parent material is more porous, and thus more intense weathering can take place. The age of a soil is determined by the relative degree of profile development rather than by the number of years that the soil has been subject to the soil-forming processes.

Immature soils have little profile development and have retained many of the characteristics of the original parent material. In Lewis County, the immature soils are primarily on flood plains where the seasonal high water table and the deposition of fresh materials prevent the development of distinct soil horizons. Kinnick, Newark, Nolin, and Haymond soils are examples. Some immature soils are on side slopes where runoff and geologic erosion prevent profile development. Berks and Brownsville soils are examples.

Mature soils have well developed soil horizons. Aaron, Beasley, Crider, Hagerstown, Covedale, and Wheeling soils are examples. These soils are generally on relatively stable surfaces. Weathering has translocated minerals and finer material into the subsoil and has developed well defined soil horizons.

Processes of Horizon Differentiation

The formation of a succession of layers, or horizons, in a soil is the result of one or more of the following processes—the accumulation of organic matter; the leaching of carbonates and other soluble minerals; the chemical weathering of primary minerals into silicate clay minerals; the translocation of the silicate clays, and probably some silt-sized particles, from one horizon to another; and the reduction, reoxidation, and translocation of iron.

Several of these processes have been active in the formation of most of the soils in Lewis County. The interaction of the first four processes is reflected in the strongly expressed horizons of the Crider and Hagerstown soils. All five processes have probably been active in the formation of the moderately well drained Aaron, Nicholson, Otwell, and Tilsit soils.

Some organic matter has accumulated in all of the soils in the county. It forms the surface layer, or the A horizon. Most of the soils in the county have a moderate content of organic matter in the surface layer. If tilled, this A horizon becomes part of the Ap horizon.

Most of the soils in the county are acid in the upper layer, even the soils that formed in nonacid parent material. The carbonates and other water-soluble materials have been partially leached into the lower layers or out of the profile. Beasley and Crider soils are examples of soils in which this process has occurred.

The translocation of clay minerals is an important process in the horizon development of many of the soils in the county. As clay minerals are removed from the A horizon, they accumulate as clay films on the faces of peds, in pores, and in root channels in the B horizon.

A fragipan has formed in the B horizon of some of the moderately well drained and somewhat poorly drained soils on terraces and uplands. The fragipan is a dense, compact layer that is hard or very hard when dry and brittle when moist. It is slowly permeable or

very slowly permeable and has few to many bleached fracture planes that form polygons.

Gleying, or the reduction and transfer of iron, has occurred in all soils that do not have good natural drainage. These soils demonstrate redoximorphic features identified by the reduction and reoxidation of iron and other minerals. This is identified by the low-chroma or gray colors that may dominate the soil matrix and that are often mixed with brighter colors of yellows, browns, and reds. Nodules or concretions of iron or manganese oxide commonly form under these conditions.

As silicate clays form from primary minerals, some iron is commonly freed as hydrated oxides. These oxides are generally red, and even if they occur in small amounts, they give a brownish color to the soil material. They are largely responsible for the strong brown and yellowish brown colors that dominate the subsoil of many of the soils in Lewis County.

Physiography and Geology

Paul Howell, geologist, Natural Resources Conservation Service, helped to prepare this section.

Lewis County is in four physiographic regions. West to east, these are the Outer Bluegrass, the Knobs, the Mississippian Plateau, and the Eastern Kentucky Coalfields Physiographic Regions. The Outer Bluegrass Region, which makes up about 20 percent of the county, is in the western part of the county; the Knobs Region, which also makes up about 20 percent, is in the west-central part; the Mississippian Plateau Region, which makes up about 57 percent, is in the central and eastern parts; and the Eastern Kentucky Coalfields Region, which makes up about 3 percent, is in the extreme eastern and southeastern parts of the county.

Relating physiographic regions to geology, the Outer Bluegrass Region occurs on geologic strata of the Ordovician and Silurian Systems; the Knobs Region is on strata of the Devonian System; the Mississippian Plateau is underlain by strata of the Mississippian System; and the Eastern Kentucky Coalfields is on strata of the Pennsylvanian System. In addition to these geologic systems, the flood plains and terraces of the county are on deposits of the Quaternary System.

Since it occurs in four physiographic regions and on six geologic systems, Lewis County is very diverse in landforms, geologic material, and soils. This diversity is largely due to differential weathering and erosion of the underlying bedrock of varying composition. The diversity of bedrock composition is expressed by the variety of soils that formed from the weathering or erosion, or both, of the bedrock. The major geologic strata underlying the soils in the county are of the Paleozoic Era (USGS 1964, 1965a-c, 1966a-d, 1967a-c, 1972, 1975a-c, 1976, 1978). The Mississippian, Devonian, Silurian, and Ordovician sedimentary rocks were deposited in shallow seas 250 to 500 million years ago, while the Pennsylvanian sedimentary rock was deposited in a deltatic environment. Some of the broad, flat ridgetops in the Tollesboro area, which is in the western part of the county, have a thin mantle of lacustrine-like sediments or loess deposits, or both, overlying the Crab Orchard shales of the Silurian System. The stream valleys consist of alluvium of the Quaternary System. The Ohio River valley has several areas where deposits of glacial outwash and wind-transported sands overlie this alluvium.

Table 21 shows the relationship or association of soils to the composition of the underlying bedrock. It includes the geologic systems and their formations, members, beds, or deposits, or a combination of these; and the material makeup of the predominant soils identified as occurring on the geologic systems in the county. This soil to geologic parent material relationship is also shown on the geologic cross-sectional map of Lewis County located in the map section at the back of this survey.

Additional information about the relationship of soil formation to geologic parent material for this survey area can be obtained from the "General Soil Map," which is in the map section at the back of this survey. The 12 general soil map unit delineations shown on the general soil map for Lewis County very nearly trace the geologic systems, their formations, or their members. For example, general soil map unit 4, Fairmount-Faywood, occurs only in those areas where the limestone and calcareous shale of the Bull Fork Formation of the Ordovician System are the dominant parent materials. General soil map unit 8, Covedale-Trappist, occurs in areas where the parent material is predominantly from the black, fissile shales of the Ohio Formation of the Devonian System and, to a minor extent, from the black, fissile shales of the Sunbury Formation of the Mississippian System. General soil map unit 1, Wheeling-Nolin-Otwell, occurs in areas of nonlocal alluvium along the Ohio River in alluvial deposits of the Quaternary System. Each of the other nine general soil map units and their delineation boundaries will directly correspond to the underlying geologic strata. It was from the geologic quadrangle maps for the county that the general soil map was

drawn. For additional information on the general soil map and its map units, see the section entitled "General Soil Map Units."

The six geologic systems identified within Lewis County have been further subdivided into a number of formations, members, beds, or deposits. These materials have influenced the landscape and the soils that have formed on them. For discussion, the geologic systems and their different subdivisions will be listed in downward sequence of youngest to oldest, beginning with the Quaternary System in the valleys and ending with the Ordovician System along the Lewis-Mason County line in the northwestern part of the survey area.

Quaternary System. The alluvium in Lewis County can be broadly divided into two separate groups. The first is local source alluvium, or local alluvium. Local alluvium is derived from geologic strata within the boundaries of the county and has been subsequently deposited on flood plains and terraces along streams in the county. The second group is nonlocal source alluvium, or nonlocal alluvium. This alluvium is derived from a source outside of Lewis County, namely, the Ohio River valley watershed, and has been deposited along the Ohio River in Lewis County.

The local alluvium is on terraces and flood plains that are primarily adjacent to large streams, such as the Kinniconick Creek, Salt Lick Creek, Quicks Run, Cabin Creek, and the North Fork of the Licking River. This material consists of sands, silts, clays, and gravel weathered and eroded from the landscape of the watershed for that stream. These alluvial soils generally are nearly level to moderately sloping and moderately deep to very deep. They have a strongly acid to slightly acid, silty or loamy subsoil. The dominant soils on terraces are those in the Elk, McGary, and Otwell series, and the dominant soils on low terraces and fans are those in the Morehead, Sees, and Woolper series. The dominant soils on most flood plains are those in the Haymond, Melvin, Newark, and Kinnick series; however, on flood plains in the northwestern part of the county, the moderately deep Boonesboro soils are dominant in areas that are underlain by Grant Lake and Bull Fork Formation limestones. Also, if there is a high content of gravel in the deposits on flood plains, the dominant soils are those in the Skidmore series.

The nonlocal alluvium is on terraces and flood plains along the Ohio River, which forms the northern boundary of the county. This material consists of sands, silts, and clays with some gravel and larger, coarse fragments. Much of this material has been transported from upstream of Lewis County, originating in a five-state watershed area that makes up the headwaters of the Ohio River. These alluvial soils are generally nearly level to steep and very deep. They have a very strongly acid to neutral, loamy subsoil. The dominant soils on terraces are those in the Ashton, Lawrence, Morehead, Otwell, and Wheeling series, and the dominant soils on flood plains are those in the Melvin, Newark, and Nolin series.

In several large areas, eolian (wind-transported) sands, glacial outwash, and, in some small areas, lake sediments have been deposited over the nonlocal alluvium. The eolian sands are in areas along two sharp bends of the river, where the water flows south. The first area is near the communities of Trinity Station and Sand Hill, at the western end of the county, and the other is near the community of Black Oak, directly east of Vanceburg. The eolian material consists of fine grained and medium grained sands mixed with silt. The dominant soils are those in the Lakin and Chavies series.

The glacial outwash is in small areas along the length of the Ohio River in Lewis County. This material consists of well sorted sand, gravel, and silt. The dominant soils are those in the Chavies, Otwell, and Wheeling series.

The lake sediments are in small areas along the Ohio River. This material consists of silt and clay and is commonly calcareous. The dominant soils are those in the Elk, Otwell, and Wheeling series and in some soil phases of the Morehead and McGary series.

Pennsylvanian System. The Pennsylvanian System is an ancient delta deposit consisting of complexly interbedded and interlensing layers of sandstones, siltstones, and shales and minor beds of coal and underclays. It underlies the ridgetops in the eastern part of Lewis County, where the County line joins that of Carter, Greenup, and Rowan Counties (USGS 1964, 1966b, 1975b-c, 1976, 1978). In Lewis County this system is comprised of the Breathitt Formation, the undivided Breathitt and Lee Formations, and a very small area of the Lee Formation that is identified as a separate formation on the Olive Hill Quadrangle. These formations have several diverse material layers, or beds, identified as occurring in one or all three formations. Separation of the layers is a problem because of thinness or inadequate exposure, or both; however, at least three different members or beds can be readily identified and related to soil formation in the area.

The major soil-forming material in the Pennsylvanian System is the Grayson Sandstone bed, along with several other sandstone and shale layers that make up most of the three formations. These formations occur at elevations ranging from 1,000 to

1,300 feet. The Grayson Sandstone bed is light gray, quartzose, medium grained, and crossbedded and, over most of the area, tends to grade laterally into shale as it extends to the northeast (USGS 1976). The other major sandstone layer occurs near the base of the Pennsylvanian System. These sandstones tend to be light gray, fine grained to coarse grained, clean, quartzose, and crossbedded. They generally form cliffs or recesses where they are crossed by streams. The shale layers tend to be gray to black, are carbonaceous, and weather to yellowish brown silt and clay. Generally, the soils are moderately deep to very deep, are moderately acid to very strongly acid, and have a silty or loamy subsoil that may contain large amounts of rock fragments. These areas are dominated by Gilpin and Tilsit soils on ridgetops and Berks, Brownsville, and Shelocta soils on side slopes. Many areas have exposures of sandstone rock outcrops at the base of the Pennsylvanian System, where it rests on top of the Mississippian System.

The other two identifiable map beds in the Pennsylvanian System are the Bruin Coal Bed and the Olive Hill Clay Bed of Crider. These formations are discontinuous and generally have contributed little to the soil formation in Lewis County. Most areas where they are exposed have been mined in the past and are identified as Pits, quarries, in this soil survey. The Olive Hill Clay Bed of Crider that is at elevations ranging from 1,000 to 1,180 feet consists of three types of clay in irregular, nonbedded lenses of variable thickness and shapes. About one-third of the bed is flint clay, and the other two-thirds is dominantly semiflint clay with subordinate amounts of plastic clay, but all variations in hardness are present in different parts of the bed. The Olive Hill Clay Bed of Crider was the principal source of the raw material used in the refractory industry of eastern Kentucky. The average yearly production was 411,385 tons during the period 1947-56 (Patterson and Hosterman 1960). Evidence of the extent of mining can still be found in the numerous scattered, unreclaimed mine sites, which range in size from 1 to 25 acres or more, along the ridges in this area. In some areas the overlying Bruin Coal Bed indicates that this clay may be underclay. This discontinuous coal bed is at elevations of about 1,160 feet and is as much as 6 inches thick (USGS 1976).

Mississippian System. The Mississippian System is the dominant geologic system in Lewis County. This system and its formations and members underlie the ridgetops, side slopes, and flood plains of the Mississippian Plateau; form the peaks of some of the Knobs; and are the source of parent material for soils on flood plains and terraces in stream valleys in the eastern two-thirds of the survey area. The Mississippian System is comprised of the Carter Caves Sandstone, Newman Limestone, Borden, Sunbury Shale, Berea Sandstone, and Bedford Shale Formations and their respective members. The highest elevation in the county is 1,360 feet. It is on the Cowbell Member of the Borden Formation, in the southwestern part of the county along the Fleming-Lewis County line (USGS 1975c).

The Carter Caves Sandstone Formation is on narrow ridgetops in the eastern part of the survey area where Lewis County joins with Carter County. The lower contact is poorly exposed and approximately located and appears conformable with Newman Limestone. The Carter Caves Sandstone is white to very light gray, fine grained or medium grained, quartzose, well sorted, thinly bedded to thickly bedded, largely crossbedded, and moderately resistant to weathering and, where exposed, tends to form ledges (USGS 1976). Because of its limited extent, its effect on soil formation in the survey area has been minor. The dominant soils are those in the Gilpin series.

The Newman Limestone Formation is on narrow to moderately broad ridgetops in the southeastern part of the county, where it is overlain with the Pennsylvanian System. It consists of several different limestone and shale layers and is at elevations ranging from 1,080 feet along the Carter-Lewis County line to 1,240 feet on Golden Ridge, in the southern part of the county. The limestones are white, olive, gray, or light brown; finely crystalline to coarsely crystalline; and thinly bedded to thickly bedded. Some are silty or dolomitic, and most contain chert (USGS 1976). These limestones are often exposed as ledges or rock outcrop or as 3- to 10-foot-high cliffs. The shale layers tend to be red, green, or gray; thinly bedded; calcareous; and clayey. The soils that have developed on these materials are generally moderately deep and have a red, very strongly acid to mildly alkaline, clayey subsoil that may contain limestone or chert fragments. The dominant soil is the Caneyville soil that is mapped in a complex with rock outcrop.

The Borden Formation has four identifiable members in the survey area. These members are Nada Shale, Cowbell Siltstone, Nancy Shale, and Farmers Sandstone. These materials have influenced the landscape and the soils that have formed on them.

The Nada Shale Member consists of a thin shale layer that is on narrow ridgetops in the northern part of the survey area near the Greenup-Lewis County line and extends southward to the Lewis-Rowan County line. Elevations range from 1,080 feet in the northeastern part of the county to 1,300 feet in the

south. It is the interval between the overlying Newman Limestone Formation, if it occurs, and the underlying Cowbell Siltstone. It often is exposed in the saddle areas between the higher peaks. It is comprised mostly of a very dark red to greenish gray, calcareous, clayey, plastic shale. Because of the Nada's limited extent and the generally small, narrow areas, the soils formed in this material were included with the Gilpin soils during mapping. The role of the Nada Shale Member in this soil survey was as an identifiable layer between geologic strata.

The Cowbell Member forms the steep peaks, narrow ridgetops, and steep side slopes at the highest elevations in the survey area. Elevations range from 720 feet on the lower slopes near the community of Kirksville in the northeastern part of the county to 1,360 feet on several peaks along the Fleming-Lewis County line in the southwestern part. The Cowbell Member consists of siltstone and shale. The siltstone is light brownish gray to greenish gray and weathers light gray to yellowish gray. It is thin to thick, irregularly bedded; rarely crossbedded; and calcareous, especially in the upper layers. The shale is olive to greenish gray, silty and clayey, and locally abundant in the middle and lower parts of the Cowbell Member (USGS 1976). Soils formed in this material are moderately deep to very deep; have an extremely acid to slightly acid, loamy subsoil; and contain large amounts of rock fragments. The dominant soils are those in the Berks, Brownsville, and Shelocta series.

The Nancy Member is nearly as extensive as the Cowbell Member. In the eastern half of the survey area, it forms the steep side slopes, where it is generally overlain by colluvial material from the geologic strata above. In the central part of the county, it forms the moderately broad and broad ridgetops and many of the footslopes along the Kinniconick Creek. It is at elevations ranging from 700 feet on the lower slopes at the community of Kirksville in the northeastern part of the county to 1,240 feet on several peaks above the town of Petersville in the southwestern part. It consists of layered shale with some siltstone and sandstone. The shale is bluish to greenish gray, slightly silty to very silty, and irregularly bedded. The siltstone is shaly and contains numerous Zoophycos, or rooster tails (fig. 19), and curly worm marks. The sandstone is light yellowish brown, very fine grained, evenly bedded, and similar to sandstone in the underlying unit (USGS 1976). Soils formed in this material are moderately deep or deep and have an extremely acid to strongly acid, loamy or silty subsoil. The dominant soils are those in the Blairton and Tilsit series.

The Farmers Member forms the very steep, prominent sandstone ledges and cliffs along the lower valley walls of the Kinniconick Creek. It is the underlying, resistant base material for the ridgetops and side slopes in the central part of the county. On side slopes it forms many rock outcrop ledges that are 1 to 3 feet thick and weathers to numerous stones and small boulders on the surface. It is at elevations ranging from 560 feet on the lower slopes at the community of Quincy in the northeastern part of the county to 1,200 feet on ridgetops above the town of Vanceburg. It consists mostly of sandstone with some thin shale layers that are similar to the shale of the overlying Nancy Member. The sandstone is light brownish gray to yellowish brown, very fine grained, dominantly quartzose, and in even, medium to thick beds that are porous and permeable (USGS 1976). It also contains abundant Zoophycos and worm trails throughout, like the overlying Nancy Member. Soils formed in this materal are moderately deep to very deep and have an extremely acid to strongly acid, loamy subsoil that contains numerous coarse sandstone fragments. The dominant soils are those in the Berks, Brownsville, and Shelocta series.

The lower formations of the Mississippian System—the Sunbury Shale, Berea Sandstone, and Bedford Shale—are in the west-central part of the county. Generally, these formations are overlain by colluvium from the upper geologic strata on the steep side slopes, but they may become exposed in saddle areas between the higher peaks and, in a few areas, form the top of the conical-shaped knobs or hills, which are the landforms from which the Knobs Physiographic Region derived its name. The Sunbury Formation consists of dark gray to black, thinly bedded, carbonaceous, fissile shale; the Bedford Formation consists of olive gray to greenish gray, silty shale; and the Berea Formation consists of light gray to yellowish gray, very fine grained, well sorted sandstone. Elevations range from 540 feet on the lower side slopes near the community of Garrison in the northeastern part of the county on the Berea Formation to 1,200 feet on ridgetops above the community of Covedale in the northwestern part of the county on the Sunbury Formation. Exposures of these formations tend to be small in area, and although their influence on soil formation has been limited, it is most apparent in the Sunbury and Berea Formations. Soils formed on the Sunbury Formation are shallow to very deep and have an extremely acid, clayey subsoil with numerous shale fragments. The dominant soils are those in the Colyer, Covedale, and Trappist series. Soils formed on the Berea Formation are moderately deep to very deep, have a strongly acid to slightly

Figure 19.—Zoophycos, or rooster tails, in the siltstone of the Nancy Member.

acid, loamy subsoil with large amounts of coarse sandstone fragments. The Berea Formation also tends to form 1- to 2-foot-thick ledges on side slopes. The dominant soils are those in the Berks and Brownsville series.

Devonian System. The Devonian System consists of the Ohio Shale Formation, which forms the bulk of the Knobs Physiographic Region in the west-central part of the county. The Ohio Shale Formation underlies most of the side slopes and footslopes of these knobs and some of the ridgetops in the Covedale area. Elevations range from 560 feet on the lower side slopes at Vanceburg to 1,100 feet at the head of Kinniconick Creek. The formation consists of dark gray to black, thinly bedded, highly carbonaceous, fissile shale. In many areas it contains sparse lenses of calcareous siltstone as much as 3 feet thick. Some calcareous, nodular concretions ranging from a few inches to more than a foot in diameter are near the base of the formation (USGS 1966d). Soils formed on the Ohio Shale Formation are shallow to very deep and have an extremely acid, clayey subsoil. The dominant soils are those in the Colyer, Covedale, and Trappist series.

Silurian System. The Silurian System is in the Outer Bluegrass Physiographic Region and underlies most of the western part of the county. It has formed the moderately broad and broad ridgetops and short, steep side slopes. It also underlies the broad, flat areas around Tollesboro and the flood plains and terraces of the Salt Lick and Quicks Run watersheds. This system consists of dolomitic limestone and calcareous clay shales of the Bisher Limestone, Upper Crab Orchard, and Lower Crab Orchard Formations.

The Bisher Limestone Formation forms several broad, plateau-like ridgetops with karst topography in the area near Ribolt and Covedale. It forms the interval between the overlying Devonian System and the underlying Crab Orchard shales of the Silurian System. It is exposed as discontinuous, thinly bedded rock ledges in the southern part of the county around

Pine Valley, where it is often covered by colluvium from soils higher on the landscape, and as 20- to 25-foot-high cliffs and the numerous, large, detached boulders on slopes below the cliffs in the northern part of the county near the communities of Charters and Concord. This formation and its contact with the Devonian System can best be viewed along Kentucky Highway 9 at the Herron Hill Gap. Elevations range from 475 feet where it crosses the Ohio River downstream from Vanceburg to 970 feet on side slopes at Covedale. The formation consists of dolomite and dolomitic limestone that weathers to dark yellowish orange to reddish brown. It is fine grained to coarse grained and is evenly or irregularly bedded. It contains sparse pyritic concretions and nodules. Petroleum residue is common in the more porous beds (USGS 1966d). Soils that have developed are moderately deep to very deep and have a very strongly acid to moderately alkaline, silty or clayey subsoil. The dominant soils on ridgetops are those in the Beasley Crider, and Nicholson series, while the dominant soils on side slopes and near ledges are those in the Beasley, Caneyville, and Hagerstown series.

The Upper Crab Orchard Formation underlies the short, steep side slopes; the moderately broad ridgetops; and most of the broad, flat areas around Tollesboro. Elevations range from 540 feet on the lower side slopes at Allis Chapel on Quicks Run to 960 feet at the top of Hyman Knob on Chalk Ridge. This formation consists of calcareous clay shale that is variegated and mostly greenish gray and gray with thin red, brown, and yellow zones. It is thinly bedded, obscurely laminated, and fissile to blocky and expands and becomes plastic when wet. It contains scattered, very thin beds of yellowish brown, fine grained, silty dolomite, especially in the upper part of the formation (USGS 1966d). On side slopes, this formation is subject to slumping and landsliding. Soils that have developed on side slopes are moderately deep and have a slightly acid to moderately alkaline, clayey subsoil. The dominant soils are those in the Shrouts series. On the broad flat ridgetops around the communities of Tollesboro and Burtonville, this formation has a silt-clay/lacustrine-like mantle deposited over the clayey, calcareous shale. Soils that developed are deep and very deep, are silty in the upper part of the subsoil and clayey in the lower part of the subsoil, and become more alkaline with depth. The dominant soils are those that are in the Aaron, Lawrence, McGary, and Nicholson series. Because of the underlying clay shale, which restricts the downward movement of water, most areas are moderately or severely limited by the wetness.

The Lower Crab Orchard Formation underlies many of the short, upper side slopes and narrow to moderately wide ridgetops in the western part of the county. Elevations range from 580 feet on the lower side slopes at Concord in the north-central part of the county to 800 feet on ridgetops at the community of Epworth near the Fleming-Lewis County line in the southwestern part of the county. This formation consists of interbedded dolomite and dolomitic limestone with calcareous clay shale. The dolomites are medium gray to light bluish gray, weathering to reddish brown. They are fine to medium crystalline with some being coarse grained, thin to medium bedded, irregularly or evenly bedded, and locally ripple marked. Most contain chert and, locally, some have petroleum residue. The dolomites tend to form rock ledges 1 to 3 feet thick on side slopes. The clay shale is greenish gray, thinly bedded, fissile, and plastic when wet (USGS 1966d). Soils that have developed are moderately deep and deep and have a moderately acid to moderately alkaline clay subsoil. The dominant soils are those in the Beasley and Shrouts series. The dominant soils in areas having a remnant silt mantle are those in the Crider and Nicholson series.

Ordovician System. The Ordovician System occurs in a limited area of the county underlying the middle and lower side slopes and flood plains of the Cabin Creek, Crooked Creek, and Trinity areas to the northwest of the town of Tollesboro. This system is comprised of three formations—the Preachersville Member of the Drakes, the Bull Fork, and the Grant Lake.

The Preachersville Member of the Drakes Formation underlies the upper side slopes and is the interval between the overlying Silurian System and the underlying Bull Fork Formation. Elevations range between 600 feet at Concord to 880 feet on the Lewis-Mason County line north of Cabin Creek. It consists of interbedded shale and silty dolomite. The shale is grayish green, locally reddish purple, thinly bedded, fissile, calcareous, and mostly clayey but locally silty. The dolomite is thinly bedded, yellowish brown, and fine grained to coarse grained and contains chert (USGS 1966d). Soils that developed are deep and have a moderately acid to moderately alkaline, clayey subsoil. The dominant soils are those in the Beasley series.

The Bull Fork Formation underlies the side slopes and the upper flood plains of Cabin Creek and Crooked Creek in the northwestern part of the county. Elevations range from 540 feet at Chalkey Station to 840 feet on the Lewis-Mason County line. It consists of interbedded shale and limestone. Shale content increases from about 20 percent at the base of the

formation to about 80 percent at the top. The shale is gray to grayish green, thinly bedded, fissile, calcareous, clayey, and plastic when wet. The limestone is gray to bluish gray, thin to medium bedded, locally ripple marked, and composed of closely packed fossil fragments in a very fine grained to fine grained matrix. Locally abundant are brachiopods and bryozoans, horn coral, crinoid columns, trilobites, pelecypods, gastropods, and cephalopods (USGS 1966d). Most slopes are littered with numerous limestone flagstones at the surface. Soils that have developed are shallow to very deep and have a strongly acid to moderately alkaline, clayey subsoil. The dominant soils are those in the Fairmount, Faywood, and Woolper series.

The Grant Lake Formation is subdivided into Upper and Lower Members, but because of their minor occurrence on the lower side slopes and flood plains at the mouth of Cabin Creek, the two members will be treated as one. Elevations range from 520 feet to 660 feet at Cabin Creek. This formation consists mostly of limestone that is light gray to olive gray and thinly bedded and consists of whole fossils of various sizes and fossil fragments in a very fine grained to medium grained, argillaceous, limestone matrix. Of minor extent are some thin, gray shale beds. Some exposures in the Cabin Creek bed show remarkable ripple marking. Soils that have developed are like those of the overlying Bull Fork Member.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Backslopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chert. A hard, dense or compact, dull to semivitreous, cryptocrystalline sedimentary rock, consisting of cryptocrystalline silica (microcrystalline fibrous quartz; i.e., chalcedony) with lesser amounts of micro- or crypto-crystalline quartz and amorphous silica (opal). It has a tough, splintery to conchoidal fracture and may be white or variously colored gray-green, blue, pink, red, yellow, brown, or black. It commonly occurs as nodular or concretionary segregations in limestone and dolomite.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper

tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic).—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated).—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The inclined surface at the base of a hill.

Forage. Food for browsing or grazing animals.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Formation. The basic rock-stratigraphic unit in the local classification of rock (commonly a sedimentary stratum or strata but also igneous and metamorphic rocks) generally characterized by some degree of internal lithologic homogeneity of distinctive lithologic features, such as chemical composition, structures, texture, or general kind of fossils; by a prevailing, but not necessarily tabular, shape; and by mappability at the Earth's surface, at scales of the order of 1:25,000, or by traceability in the subsurface layer.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Geomorphology. The science that treats the general configuration of the Earth's surface; specifically, the study of the classification, description, nature, origin, and development of landforms and their relationship to underlying structures and of the history of geologic changes as recorded by these surface features.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of

chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landform. Any physical, recognizable form or feature on the Earth's surface, having a characteristic shape, and produced by natural causes; it includes minor forms such as hill, valley, and slope.

Landscape. (geology) The distinct association of landforms, especially as modified by geologic forces, that can be seen in a single view.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Limestone. A sedimentary rock consisting of calcium carbonate, primarily in the form of calcite. Limestones are usually formed by a combination of organic and inorganic processes and include soluble and insoluble constituents; many limestones contain fossils.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Lithic contact. The boundary between soil and coherent underlying material. The underlying material must be sufficiently coherent when moist to make hand-digging with a spade impractical, although the material may be chipped or scraped with a spade. If it consists of a single mineral, it must have a hardness by Mohs scale of 3 or more; otherwise, chunks of gravel size that can be broken out must not disperse during 15 hours of shaking in water or in sodium hexametaphosphate solution.

Lithochromic mottle. High- or low-chroma colors (Munsell) in the soil profile that are not related to drainage or saturation from water (redoximorphic features) but are the result of weathering of the parent material.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material.

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Ordovician. The second period of the Paleozoic Era of geologic time extending from the end of the Cambrian Period (about 500 million years ago) to the beginning of the Silurian Period (about 425 million years ago).

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Paleozoic. The geologic era between the Precambrian and Mesozoic; it covers the period between 600 million years ago and 230 million years ago and was characterized by the development of the first fishes, amphibians, reptiles, and land plants.

Paralithic contact. A boundary between soil and a continuous, coherent underlying material. It differs from lithic contact in that the underlying material, if a single material, has a hardness by Mohs scale of less than 3. If not of a single material, the material will disperse more or less completely during 15 hours of shaking in water or in a sodium hexametaphosphate solution, and when moist, the material can be dug with difficulty with a spade.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Perennial streams. A creek or stream that has flowing water throughout the year.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Pliocene. The fifth and last epoch of the Tertiary Period (Cenozoic Erc) of geologic time extending from the Miocene Epoch (about 13 million years ago) to the beginning of the Pleistocene Epoch of the Quaternary Period (about 1 million years ago).

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quaternary. The second phase of the Cenozoic Era of geologic time, extending from the end of the Tertiary Period (about 1 million years ago) to the present.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the Earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum. Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Moderately sloping	6 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 30 percent
Very steep	30 percent and higher

Classes for complex slopes are as follows:

Nearly level	0 to 2 percent
Undulating	2 to 6 percent
Rolling	6 to 12 percent
Hilly	12 to 20 percent
Steep	20 to 30 percent
Very steep	30 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the Earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent

material, as conditioned by relief over periods of time.

Soil depth classes. Terms used in this survey to describe soil depth are:

Very shallow	less than 10 inches to bedrock
Shallow	10 to 20 inches to bedrock
Moderately deep	20 to 40 inches to bedrock
Deep	40 to 60 inches to bedrock
Very deep	more than 60 inches to bedrock

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in layers (strata). The term refers to geologic material. Layers in soils that result from soil formation processes are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The outermost inclined surface at the base of a hill; part of a footslope.

Topography. The relative positions and elevations of the natural or man-made features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated, relatively large, externally drained depression of the Earth's surface that is primarily developed by stream erosion.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the Earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Maysville, Kentucky)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	^{o}F	^{o}F	^{o}F	^{o}F	^{o}F	Units	In	In	In		In
January-----	39.3	19.3	29.3	68	-9	33	3.13	1.66	4.43	6	2.7
February----	43.3	21.3	32.3	71	-3	47	3.02	1.50	4.34	6	2.7
March-------	54.6	30.8	42.7	81	11	169	4.20	2.27	5.90	8	.6
April-------	65.5	39.6	52.5	86	23	383	4.20	2.61	5.63	8	.0
May---------	75.0	48.8	61.9	91	31	678	4.81	2.80	6.61	9	.0
June--------	83.4	58.1	70.7	96	42	922	3.49	2.06	4.77	7	.0
July--------	86.9	62.9	74.9	98	49	1064	4.57	2.86	6.11	7	.0
August------	85.8	61.6	73.7	98	47	1039	4.00	2.69	5.19	6	.0
September---	79.8	54.9	67.4	94	37	814	3.18	1.49	4.64	5	.0
October-----	68.5	42.4	55.4	87	24	478	2.77	1.26	4.07	5	.0
November----	55.9	33.8	44.9	79	15	201	3.49	2.09	4.75	6	.4
December----	44.3	24.6	34.4	70	0	67	3.75	2.11	5.20	7	.4
Yearly:											
Average---	65.2	41.5	53.4	---	---	---	---	---	---	---	---
Extreme---	---	---	---	99	-11	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,894	44.61	37.58	49.02	80	6.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Maysville, Kentucky)

Probability	Temperature 24 °F or lower	Temperature 28 °F or lower	Temperature 32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 13	Apr. 22	May 13
2 years in 10 later than--	Apr. 7	Apr. 17	May 7
5 years in 10 later than--	Mar. 27	Apr. 7	Apr. 25
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 24	Oct. 16	Oct. 7
2 years in 10 earlier than--	Oct. 30	Oct. 21	Oct. 11
5 years in 10 earlier than--	Nov. 11	Oct. 31	Oct. 19

Table 3.--Growing Season

(Recorded in the period 1961-90 at Maysville, Kentucky)

Probability	Daily minimum temperature during growing season: Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	205	183	155
8 years in 10	212	191	162
5 years in 10	227	206	177
2 years in 10	241	221	191
1 year in 10	249	228	198

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AaB	Aaron silt loam, 2 to 6 percent slopes	1,291	0.4
AsB	Ashton silt loam, 2 to 6 percent slopes	309	0.1
BaB	Beasley silt loam, 2 to 6 percent slopes	1,813	0.6
BeC2	Beasley silt loam, 6 to 12 percent slopes, rocky, eroded	7,231	2.3
BhE2	Beasley-Shrouts complex, 12 to 30 percent slopes, very rocky, eroded	13,771	4.3
BnF2	Berks-Brownsville complex, 30 to 55 percent slopes, very rocky, eroded	66,973	21.3
BoF2	Berks-Brownsville-Shelocta complex, 30 to 65 percent slopes, eroded	51,455	16.2
BrB	Blairton silt loam, 2 to 6 percent slopes	875	0.3
BrC2	Blairton silt loam, 6 to 12 percent slopes, eroded	4,478	1.4
BrE2	Blairton silt loam, 12 to 30 percent slopes, eroded	13,403	4.2
Bs	Boonesboro silt loam, frequently flooded	1,101	0.3
BvF2	Brownsville-Berks complex, 30 to 60 percent slopes, eroded	24,537	7.7
CaE2	Caneyville-Hagerstown-Rock outcrop complex, 12 to 45 percent slopes, eroded	6,689	2.1
CeE2	Caneyville-Rock outcrop complex, 12 to 30 percent slopes, eroded	1,722	0.6
ChB	Chavies fine sandy loam, 2 to 6 percent slopes	654	0.2
ChC	Chavies fine sandy loam, 6 to 12 percent slopes	333	0.1
CkF2	Colyer-Trappist silt loams, 12 to 60 percent slopes, eroded	1,482	0.5
CoB	Covedale silt loam, 2 to 6 percent slopes	325	0.1
CoC2	Covedale silt loam, 6 to 12 percent slopes, eroded	1,157	0.4
CsD2	Covedale-Shrouts complex, 12 to 25 percent slopes, eroded	1,618	0.5
CtD2	Covedale-Trappist silt loams, 12 to 20 percent slopes, eroded	1,296	0.4
CtF2	Covedale-Trappist silt loams, 20 to 55 percent slopes, eroded	26,731	8.4
CxB	Crider silt loam, 2 to 6 percent slopes	229	0.1
EkB	Elk silt loam, 2 to 8 percent slopes	702	0.2
FaF2	Fairmount-Faywood complex, 20 to 55 percent slopes, very rocky, eroded	7,211	2.2
GnD2	Gilpin silt loam, 6 to 20 percent slopes, eroded	1,851	0.6
GnE2	Gilpin silt loam, 20 to 45 percent slopes, eroded	6,843	2.2
HgB	Hagerstown silt loam, 2 to 6 percent slopes	221	0.1
HgC	Hagerstown silt loam, 6 to 12 percent slopes	490	0.1
Hn	Haymond silt loam, frequently flooded	2,919	0.9
Kn	Kinnick silt loam, occasionally flooded	1,880	0.5
LkB	Lakin loamy sand, 2 to 8 percent slopes	251	0.1
LkC	Lakin loamy sand, 8 to 15 percent slopes	292	0.1
LkE	Lakin loamy sand, 15 to 35 percent slopes	429	0.1
Lw	Lawrence silt loam	2,446	0.8
Mc	McGary silt loam	1,306	0.4
Me	Melvin silt loam, frequently flooded	1,182	0.4
Mo	Morehead silt loam, rarely flooded	520	0.2
Ne	Newark silt loam, occasionally flooded	3,368	1.1
NhB	Nicholson silt loam, 2 to 6 percent slopes	2,108	0.7
NhC	Nicholson silt loam, 6 to 12 percent slopes	185	0.1
No	Nolin silt loam, occasionally flooded	854	0.3
OtB	Otwell silt loam, 2 to 6 percent slopes	2,164	0.7
OtC	Otwell silt loam, 6 to 12 percent slopes	307	0.1
Pt	Pits, quarries	75	*
Se	Sees silt loam, 2 to 4 percent slopes, occasionally flooded	375	0.1
ShC	Shelocta gravelly silt loam, 6 to 12 percent slopes	2,219	0.7
ShD	Shelocta gravelly silt loam, 12 to 20 percent slopes	994	0.3
SkF2	Shelocta silt loam, 20 to 45 percent slopes, eroded	2,934	0.9
SmB	Shelocta-Skidmore complex, 2 to 6 percent slopes	2,765	0.9
SrB	Shrouts silty clay loam, 2 to 6 percent slopes	103	*
SrD3	Shrouts silty clay loam, 12 to 30 percent slopes, severely eroded	12,018	3.8
SsC2	Shrouts-Beasley complex, 6 to 12 percent slopes, eroded	1,751	0.6
Sx	Skidmore gravelly silt loam, occasionally flooded	8,909	2.8
TsB	Tilsit silt loam, 2 to 6 percent slopes	1,645	0.5
TsC	Tilsit silt loam, 6 to 12 percent slopes	105	*
TtB	Trappist silt loam, 2 to 6 percent slopes	100	*
Ud	Udorthents, smoothed	276	0.1
WeB	Wheeling loam, 2 to 6 percent slopes	3,385	1.1
WeC	Wheeling loam, 6 to 12 percent slopes	501	0.2
WnD	Wheeling-Nolin complex, 2 to 30 percent slopes	2,052	0.6

See footnote at end of table

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
WoB	Woolper silty clay loam, 2 to 6 percent slopes, rarely flooded	1,663	0.5
WoC	Woolper silty clay loam, 6 to 12 percent slopes	333	0.1
	Total land area	309,205	97.6
W	Water areas greater than 40 acres in size	7,423	2.3
W	Water areas less than 40 acres in size	415	0.1
	Total land and water areas	317,043	100.0

* Less than 0.1 percent.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
AaB------------- Aaron	IIe	110	2,600	35	40	4.0	4.0	8.0
AsB------------- Ashton	IIe	130	3,200	40	45	5.0	5.5	9.5
BaB------------- Beasley	IIe	105	2,800	35	40	5.0	4.5	8.0
BeC2------------ Beasley	IIIe	80	2,300	25	30	3.0	3.5	6.0
BhE2------------ Beasley-Shrouts	VIe	---	---	---	---	---	---	3.6
BnF2------------ Berks-Brownsville	VIIe	---	---	---	---	---	---	2.0
BoF2------------ Berks-Brownsville-Shelocta	VIIe	---	---	---	---	---	---	2.0
BrB------------- Blairton	IIe	95	2,500	30	35	3.5	4.0	6.5
BrC2------------ Blairton	IIIe	85	2,200	25	30	3.0	3.0	5.5
BrE2------------ Blairton	IVe	75	1,600	---	20	3.0	---	5.0
Bs-------------- Boonesboro	IIw	100	2,800	40	40	3.0	3.5	6.0
BvF2------------ Brownsville-Berks	VIIe	---	---	---	---	---	---	---
CaE2------------		---	---	---	---	---	---	3.0
Caneyville-----	VIe							
Hagerstown-----	VIe							
Rock outcrop---	VIIIs							
CeE2------------		---	---	---	---	---	---	---
Caneyville-----	VIe							
Rock outcrop---	VIIIs							
ChB------------- Chavies	IIe	115	2,400	40	45	3.5	5.0	7.0
ChC------------- Chavies	IIIe	100	2,100	35	40	3.5	4.5	7.0

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
CkF2------------ Colyer-Trappist	VIIe	---	---	---	---	---	---	---
CoB------------- Covedale	IIe	100	2,600	35	45	4.0	4.5	6.5
CoC2------------ Covedale	IIIe	80	2,400	30	45	3.5	4.0	6.0
CsD2------------		---	---	---	---	2.5	---	5.0
Covedale-------	IVe							
Shrouts--------	VIs							
CtD2------------ Colyer-Trappist	IVe	75	2,000	---	30	3.0	3.0	5.0
CtF2------------ Colyer-Trappist	VIIe	---	---	---	---	---	---	3.5
CxB------------- Crider	IIe	135	3,300	45	50	5.5	5.5	11.0
EkB------------- Elk	IIe	130	3,200	40	45	4.5	5.5	9.0
FaF2------------ Fairmount-Faywood	VIIe	---	---	---	---	---	---	3.0
GnD2------------ Gilpin	IVe	85	2,100	25	35	3.0	3.0	5.5
GnE2------------ Gilpin	VIe	---	---	---	---	---	---	3.0
HgB------------- Hagerstown	IIe	135	3,300	45	50	5.5	5.5	11.0
HgC------------- Hagerstown	IIIe	120	2,800	40	45	4.5	5.0	11.0
Hn-------------- Haymond	IIw	120	2,800	40	40	4.0	4.5	9.0
Kn-------------- Kinnick	IIw	120	2,800	40	40	4.0	4.5	9.0
LkB------------- Lakin	IIIs	80	2,000	30	35	2.5	3.5	6.0
LkC------------- Lakin	IVs	70	1,800	25	30	2.0	3.0	5.0
LkE------------- Lakin	VIIs	---	---	---	---	---	---	3.0
Lw-------------- Lawrence	IIIw	80	1,700	35	30	3.0	---	5.5
Mc-------------- McGary	IIIw	100	1,700	35	30	3.0	---	5.0

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
Me------------- Melvin	IIIw	75	---	30	25	3.0	---	6.5
Mo------------- Morehead	IIw	100	2,500	40	40	4.0	---	8.0
Ne------------- Newark	IIw	110	2,500	40	45	4.5	---	8.5
NhB------------ Nicholson	IIe	125	3,000	40	40	4.0	---	8.0
NhC------------ Nicholson	IIIe	110	2,700	35	35	3.5	---	7.0
No------------- Nolin	IIw	120	2,800	40	40	4.0	4.5	9.0
OtB------------ Otwell	IIe	105	2,700	35	40	4.0	---	8.0
OtC------------ Otwell	IIIe	95	2,400	30	35	3.5	---	7.0
Pt------------- Pits, quarries	VIIIs	---	---	---	---	---	---	---
Se------------- Sees	IIw	90	2,000	35	40	4.0	---	7.5
ShC------------ Shelocta	IIIe	100	2,300	30	40	4.0	4.5	7.0
ShD------------ Shelocta	IVe	80	2,000	---	35	3.5	3.5	6.0
SkF2----------- Shelocta	VIIe	---	---	---	---	---	---	2.0
SmB------------		80	2,500	30	30	3.0	3.0	5.5
Shelocta-------	IIe							
Skidmore-------	IIIs							
SrB------------ Shrouts	IIe	90	2,500	30	35	3.5	3.5	6.0
SrD3----------- Shrouts	VIIe	---	---	---	---	---	---	3.0
SsC2----------- Shrouts-Beasley	IVe	85	2,100	---	30	---	---	6.5
Sx------------- Skidmore	IIIs	80	2,500	30	30	3.0	3.0	5.5
TsB------------ Tilsit	IIe	105	2,500	35	40	3.5	---	7.0
TsC------------ Tilsit	IIIe	90	2,200	25	35	3.0	---	6.5

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Alfalfa hay	Pasture
		Bu	Lb	Bu	Bu	Ton	Ton	AUM*
TtB------------- Trappist	IIe	80	2,200	30	30	3.0	---	6.5
Ud-------------- Udorthents, smoothed	VIIe	---	---	---	---	---	---	---
WeB------------- Wheeling	IIe	130	3,400	40	45	4.5	5.5	9.0
WeC------------- Wheeling	IIIe	115	2,800	35	40	4.0	5.0	8.0
WnD-------------		110	2,500	---	40	---	---	7.0
Wheeling-------	VIe							
Nolin----------	IIw							
WoB------------- Woolper	IIe	115	2,900	40	45	4.0	4.5	8.0
WoC------------- Woolper	IIIe	110	2,600	35	40	3.5	4.0	7.0
W. Water								

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Table 6.--Capability Classes and Subclasses

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass): Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	31,165	19,246	11,919	---
III	31,662	17,768	3,628	10,266
IV	22,468	22,176	---	292
V	---	---	---	---
VI	40,453	40,453	---	---
VII	181,746	177,631	---	4,115
VIII	---	---	---	---

Table 7.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
AaB------------- Aaron	5W	Slight	Moderate	Slight	Severe	White oak-----------	---	---	Northern red oak, white oak, white ash, sweetgum, pin oak, sugar maple.
						Hickory-------------	---	---	
						White ash-----------	76	---	
						Black locust--------	78	---	
						Sugar maple---------	---	---	
						Northern red oak----	---	---	
						Eastern redcedar----	---	---	
						Chinkapin oak-------	81	4	
						Sweetgum------------	---	---	
AsB------------- Ashton	7A	Slight	Slight	Slight	Severe	Sweetgum------------	87	7	Eastern white pine, yellow-poplar, black walnut, sweetgum, cherrybark oak, eastern cottonwood, white ash.
						Pin oak-------------	94	4	
						Hackberry-----------	---	---	
						Hickory-------------	---	---	
						Northern red oak----	---	---	
						Red maple-----------	---	---	
						White ash-----------	---	---	
						American sycamore---	---	---	
						Yellow-poplar-------	---	---	
						Cherrybark oak------	---	---	
						White oak-----------	---	---	
BaB, BeC2------- Beasley	3C	Slight	Moderate	Slight	Moderate	White oak-----------	61	3	White oak, white ash, hickory.
						Scarlet oak---------	---	---	
						Eastern redcedar----	41	3	
						Chinkapin oak-------	58	3	
						Hickory-------------	---	---	
						White ash-----------	63	---	
						Hackberry-----------	---	---	
						Black locust--------	---	---	
BhE2**:									
Beasley--------	3R	Moderate	Moderate	Slight	Moderate	White oak-----------	61	3	White oak, white ash, hickory.
						Scarlet oak---------	---	---	
						Eastern redcedar----	41	3	
						Chinkapin oak-------	58	3	
						Sugar maple---------	---	---	
						Hickory-------------	---	---	
						White ash-----------	63	---	
						Hackberry-----------	---	---	
						Black locust--------	---	---	
Shrouts--------	6R	Moderate	Moderate	Moderate	Moderate	Scarlet oak---------	60	3	White oak, hickory.
						Black oak-----------	60	3	
						Eastern redcedar----	45	4	
						White oak-----------	---	---	
						Black locust--------	---	---	
						Hickory-------------	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
BnF2**:									
Berks---------- (cool aspect)	4R	Moderate	Severe	Moderate	Moderate	Northern red oak----	70	4	Eastern white pine, Norway spruce, red maple, yellow-poplar, white oak.
						Black oak-----------	70	4	
						Red maple-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Eastern redcedar----	---	---	
						Yellow-poplar-------	---	---	
Brownsville---- (cool aspect)	4R	Moderate	Severe	Moderate	Moderate	Northern red oak----	75	4	Eastern white pine, yellow-poplar, white ash, black oak, white oak, shortleaf pine.
						Yellow-poplar-------	85	6	
						White oak-----------	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	
						Red maple-----------	---	---	
						Eastern hemlock-----	---	---	
						American beech------	---	---	
BnF2**:									
Berks---------- (warm aspect)	3R	Moderate	Severe	Moderate	Moderate	Black oak-----------	60	3	Virginia pine, eastern white pine, white oak, hickory.
						Virginia pine-------	60	6	
						Red maple-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
Brownsville---- (warm aspect)	3R	Moderate	Severe	Severe	Moderate	White oak-----------	---	---	Eastern white pine, Virginia pine, White oak, hickory.
						Black oak-----------	---	---	
						Chestnut oak--------	---	---	
						Hickory-------------	---	---	
BoF2**:									
Berks---------- (cool aspect)	3R	Moderate	Severe	Moderate	Moderate	Northern red oak----	60	3	Eastern white pine, Norway spruce, red pine, yellow-poplar, white oak.
						Black oak-----------	60	3	
						Yellow-poplar-------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Red maple-----------	---	---	
						American beech------	---	---	
Brownsville---- (cool aspect)	3R	Moderate	Severe	Moderate	Moderate	Northern red oak----	65	3	Eastern white pine, yellow-poplar, white ash, black oak, white oak, shortleaf pine.
						Yellow-poplar-------	75	4	
						White oak-----------	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	
						Red maple-----------	---	---	
						American beech------	---	---	
						Eastern hemlock-----	---	---	
Shelocta------- (cool aspect)	3R	Severe	Severe	Slight	Severe	White oak-----------	65	3	Shortleaf pine, white oak, eastern white pine, black walnut, yellow-poplar, white ash, northern red oak.
						Black oak-----------	73	4	
						Scarlet oak---------	70	4	
						Yellow-poplar-------	90	6	
						American beech------	---	---	
						Red maple-----------	55	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
BoF2**:									
Berks----------(warm aspect)	4R	Moderate	Severe	Moderate	Moderate	Black oak-----------	70	4	Virginia pine, eastern white pine, white oak, hickory.
						Virginia pine-------	70	8	
						Red maple-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
Brownsville----(warm aspect)	4R	Moderate	Severe	Severe	Moderate	White oak-----------	---	---	Eastern white pine, red pine, Virginia pine, yellow-poplar, white ash, black oak.
						Black oak-----------	---	---	
						Chestnut oak--------	---	---	
						Hickory-------------	---	---	
Shelocta-------(warm aspect)	4R	Severe	Severe	Severe	Severe	White oak-----------	77	4	Yellow-poplar, eastern white pine, shortleaf pine, white oak.
						Yellow-poplar-------	99	7	
						Shortleaf pine------	77	9	
						Red maple-----------	81	---	
						Scarlet oak---------	80	4	
						Black gum-----------	---	---	
						Chestnut oak--------	---	---	
BrB, BrC2-------Blairton	4A	Slight	Slight	Slight	Moderate	White oak-----------	71	4	White oak, yellow-poplar, northern red oak, white ash, eastern white pine,
						Northern red oak----	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
						Yellow-poplar-------	---	---	
						Hickory-------------	---	---	
						Scarlet oak---------	---	---	
BrE2------------Blairton	4R	Moderate	Moderate	Slight	Moderate	White oak-----------	71	4	White oak, yellow-poplar, northern red oak, white ash, eastern white pine.
						Northern red oak----	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
						Yellow-poplar-------	---	---	
						Hickory-------------	---	---	
						Scarlet oak---------	---	---	
Bs--------------Boonesboro	7A	Slight	Slight	Severe	Severe	Yellow-poplar-------	95	7	Eastern cottonwood, sweetgum, yellow-poplar, white ash.
						White ash-----------	---	---	
						Sweetgum------------	---	---	
						Hackberry-----------	---	---	
						American sycamore---	---	---	
						Black walnut--------	---	---	
						Hickory-------------	---	---	
BvF2**:									
Brownsville----(cool aspect)	3R	Moderate	Severe	Moderate	Moderate	Northern red oak----	65	3	Eastern white pine, yellow-poplar, white ash, black oak, shortleaf pine, white oak.
						Yellow-poplar-------	75	4	
						White oak-----------	---	---	
						Scarlet oak---------	---	---	
						Hickory-------------	---	---	
						Red maple-----------	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
BvF2**:									
Berks (cool aspect)	3R	Moderate	Severe	Moderate	Moderate	Black oak	60	3	Eastern white pine, red pine, white oak, hickory.
						Virginia pine	60	6	
						Chestnut oak	---	---	
						Red maple	---	---	
						Hickory	---	---	
BvF2**:									
Brownsville (warm aspect)	4R	Moderate	Severe	Severe	Moderate	White oak	---	---	Eastern white pine, Virginia pine, white oak, hickory.
						Black oak	---	---	
						Chestnut oak	---	---	
						Hickory	---	---	
Berks (warm aspect)	4R	Moderate	Severe	Moderate	Moderate	Virginia pine	70	8	Virginia pine, eastern white pine, white oak, hickory.
						Chestnut oak	---	---	
						Red maple	---	---	
CaE2**:									
Caneyville	4R	Severe	Moderate	Slight	Severe	Black oak	71	4	White oak, yellow-poplar, white ash, eastern white pine, northern red oak, hickory.
						White oak	64	3	
						Sugar maple	---	---	
						Hickory	---	---	
						White ash	72	3	
						Eastern redcedar	46	4	
						Yellow-poplar	90	6	
						Black cherry	---	---	
						Basswood	---	---	
Hagerstown	5C	Moderate	Severe	Slight	Severe	Northern red oak	85	5	Black walnut, yellow-poplar, eastern white pine, white oak, hickory.
						Yellow-poplar	95	7	
						Sugar maple	---	---	
						Black walnut	---	---	
						Hackberry	---	---	
						Hickory	---	---	
						White oak	---	---	
						White ash	---	---	
Rock outcrop.									
CeE2**:									
Caneyville	4R	Severe	Moderate	Slight	Severe	Black oak	71	4	White oak, yellow-poplar, white ash, eastern white pine, northern red oak, hickory.
						White oak	64	3	
						Sugar maple	---	--	
						Hickory	---	--	
						White ash	72	3	
						Eastern redcedar	46	4	
						Yellow-poplar	90	6	
Rock outcrop.									
ChB, ChC: Chavies	8A	Slight	Slight	Slight	Moderate	Northern red oak	---	---	Eastern white pine, yellow-poplar, black walnut, northern red oak, white oak, shortleaf pine.
						Yellow-poplar	93	7	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						Red maple	---	---	
						Hickory	---	---	
						White oak	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Plant competi- tion	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc- tivity class*	Trees to plant
CkF2**:									
Colyer----------	6R	Severe	Severe	Moderate	Slight	Virginia pine-------	60	6	Virginia pine, shortleaf pine.
						Chestnut oak--------	65	3	
						Scarlet oak---------	56	3	
						Black oak-----------	66	3	
						Hickory-------------	---	---	
Trappist--------	7R	Severe	Severe	Slight	Moderate	Virginia pine-------	62	7	Virginia pine, white oak, northern red oak.
						White oak-----------	62	3	
						Hickory-------------	---	---	
						Black oak-----------	68	4	
						Red maple-----------	---	---	
						Eastern redcedar----	---	---	
						Chestnut oak--------	58	3	
						Scarlet oak---------	---	---	
						American beech------	---	---	
						Northern red oak----	72	4	
CoB, CoC2-------- Covedale	9A	Slight	Slight	Slight	Severe	White oak-----------	59	3	Shortleaf pine, white oak, eastern white pine, yellow-poplar, northern red oak.
						Red maple-----------	---	---	
						Yellow-poplar-------	---	---	
						Black oak-----------	56	3	
						Chestnut oak--------	62	3	
						American beech------	---	---	
						Hickory-------------	---	---	
CsD2**:									
Covedale--------	9R	Moderate	Moderate	Slight	Severe	White oak-----------	59	3	Shortleaf pine, white oak, eastern white pine, yellow-poplar, northern red oak.
						Red maple-----------	---	---	
						Yellow-poplar-------	---	---	
						Black oak-----------	56	3	
						Chestnut oak--------	62	3	
						American beech------	---	---	
						Hickory-------------	---	---	
Shrouts---------	6R	Moderate	Moderate	Moderate	Moderate	Scarlet oak---------	60	3	White oak, hickory.
						Black oak-----------	60	3	
						Eastern redcedar----	45	4	
						White oak-----------	---	---	
						Hickory-------------	---	---	
CtD2**:									
Covedale--------	9R	Moderate	Moderate	Slight	Severe	Virginia pine-------	67	7	Shortleaf pine, white oak, eastern white pine, yellow-poplar, northern red oak.
						White oak-----------	59	3	
						Red maple-----------	---	---	
						Yellow-poplar-------	---	---	
						Black oak-----------	56	3	
						Chestnut oak--------	62	3	
						American beech------	---	---	
						Hickory-------------	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
CtD2**:									
Trappist-------	7C	Moderate	Moderate	Slight	Moderate	Virginia pine-------	62	7	Virginia pine, white oak, northern red oak.
						White oak-----------	62	3	
						Hickory-------------	---	---	
						Black oak-----------	68	4	
						Red maple-----------	---	---	
						Eastern redcedar----	---	---	
						Chestnut oak--------	58	3	
						Scarlet oak---------	---	---	
						American beech------	---	---	
						Northern red oak----	72	4	
CtF2**:									
Covedale-------	9R	Severe	Severe	Slight	Severe	Virginia pine-------	67	7	Shortleaf pine, white oak, eastern white pine, yellow-poplar, northern red oak.
						White oak-----------	59	3	
						Red maple-----------	---	---	
						Yellow-poplar-------	---	---	
						Black oak-----------	56	3	
						Chestnut oak--------	62	3	
						American beech------	---	---	
						Hickory-------------	---	---	
Trappist-------	7R	Severe	Severe	Slight	Moderate	Virginia pine-------	62	7	Virginia pine, white oak, northern red oak.
						White oak-----------	62	3	
						Hickory-------------	---	---	
						Black oak-----------	68	4	
						Red maple-----------	---	---	
						Eastern redcedar----	---	---	
						Chestnut oak--------	58	3	
						Scarlet oak---------	---	---	
						American beech------	---	---	
						Northern red oak----	72	4	
CxB------------- Crider	7A	Slight	Slight	Slight	Severe	Yellow-poplar-------	97	7	Eastern white pine, yellow-poplar, black walnut, white ash, northern red oak, white oak, shortleaf pine.
						Sugar maple---------	---	---	
						Black oak-----------	87	5	
						White ash-----------	---	---	
						Black walnut--------	80	---	
						White oak-----------	72	4	
						Hickory-------------	---	---	
						Northern red oak----	84	5	
EkB------------- Elk	7A	Slight	Slight	Slight	Severe	Yellow-poplar-------	94	7	Eastern white pine, yellow-poplar, black walnut, white oak, northern red oak, white ash, shortleaf pine.
						Pin oak-------------	96	6	
						Hackberry-----------	---	---	
						Red maple-----------	---	---	
						American sycamore---	---	---	
						Black walnut--------	---	---	
						Sweetgum------------	98	9	
FaF2**:									
Fairmount------	3R	Severe	Severe	Severe	Moderate	White oak-----------	55	3	White oak, Virginia pine.
						Eastern redcedar----	41	3	
						Scarlet oak---------	---	---	
						Chinkapin oak-------	55	3	
						Hickory-------------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Plant competi-tion	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc-tivity class*	Trees to plant
FaF2**:									
Faywood	4R	Severe	Severe	Slight	Moderate	Northern red oak	70	4	Eastern white pine, white oak, white ash, northern red oak.
						Scarlet oak	72	4	
						Hickory	---	---	
						White ash	---	---	
						Chinkapin oak	---	---	
						Sugar maple	---	---	
						Black locust	---	---	
GnD2 Gilpin	4A	Slight	Slight	Slight	Moderate	Northern red oak	80	4	Virginia pine, eastern white pine, yellow-poplar.
						Yellow-poplar	95	7	
						White oak	---	---	
						White ash	---	---	
						Hickory	---	---	
GnE2 Gilpin (cool aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak	80	4	Virginia pine, eastern white pine, yellow-poplar.
						Yellow-poplar	95	7	
						White oak	---	---	
						White ash	---	---	
						Hickory	---	---	
GnE2 Gilpin (warm aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak	70	4	Virginia pine, eastern white pine, white oak, yellow-poplar.
						White oak	---	---	
						Hickory	---	---	
						Chestnut oak	---	---	
HgB, HgC Hagerstown	5C	Slight	Slight	Slight	Severe	Northern red oak	85	5	Black walnut, yellow-poplar, eastern white pine, white oak, hickory.
						Yellow-poplar	95	7	
						Sugar maple	---	---	
						Black walnut	---	---	
						Hackberry	---	---	
						Hickory	---	---	
						White oak	---	---	
						White ash	---	---	
Hn Haymond	8A	Slight	Slight	Severe	Severe	Yellow-poplar	100	8	Swamp white oak, bur oak, sweetgum, red maple, pin oak, white ash, black cherry, black walnut.
						Black walnut	---	---	
						American sycamore	---	---	
						White oak	---	---	
						Hickory	---	---	
						River birch	---	---	
						Sweetgum	---	---	
						White ash	---	---	
						Pin oak	---	---	
Kn Kinnick	8W	Slight	Slight	Moderate	Severe	Sweetgum	92	8	Eastern cottonwood, green ash, cherrybark oak, sweetgum, pin oak.
						Cherrybark oak	97	10	
						Eastern cottonwood	---	---	
						River birch	---	---	
						American sycamore	---	---	
						Black walnut	---	---	
						Pin oak	---	---	
LkB, LkC Lakin	3S	Slight	Moderate	Moderate	Slight	Northern red oak	60	3	Virginia pine, eastern white pine.
						Virginia pine	60	6	
						Chestnut oak	60	3	
						Black oak	60	3	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
LkE: Lakin	3S	Slight	Severe	Moderate	Slight	Northern red oak	60	3	Virginia pine, eastern white pine.
						Virginia pine	60	6	
						Chestnut oak	60	3	
						Black oak	60	3	
Lw: Lawrence	6W	Slight	Moderate	Moderate	Severe	Yellow-poplar	85	6	Yellow-poplar, white ash, American sycamore, white oak, sweetgum, eastern white pine, pin oak.
						Sweetgum	89	7	
						White oak	74	4	
						Black oak	78	4	
						Red maple	---	---	
						Pin oak	---	---	
						Hackberry	---	---	
						American beech	---	---	
						Blackgum	---	---	
						American sycamore	---	---	
						Green ash	---	---	
						Hickory	---	---	
Mc: McGary	4W	Slight	Moderate	Moderate	Severe	White oak	70	4	Eastern white pine, red maple, yellow-poplar, American sycamore, eastern cottonwood, green ash, pin oak.
						Pin oak	85	5	
						Yellow-poplar	85	5	
						Sweetgum	80	6	
						Hickory	---	---	
						Red maple	---	---	
						Green ash	---	---	
						Post oak	---	---	
Me: Melvin	7W	Slight	Moderate	Severe	Severe	Pin oak	99	7	Pin oak, American sycamore, sweetgum, eastern cottonwood, green ash, hickory.
						Eastern cottonwood	101	9	
						Sweetgum	89	7	
						Green ash	---	---	
						Hackberry	---	---	
						Hickory	---	---	
						Red maple	---	---	
						Winged elm	---	---	
						River birch	---	---	
						American sycamore	---	---	
Mo: Morehead	10W	Slight	Moderate	Moderate	Severe	Yellow-poplar	82	5	Shortleaf pine, yellow-poplar, sweetgum, pin oak, eastern white pine, green ash.
						White oak	---	---	
						Red maple	---	---	
						Pin oak	---	---	
						Black oak	---	---	
						White oak	---	---	
						River birch	---	---	
Ne: Newark	5W	Slight	Moderate	Moderate	Severe	Pin oak	96	5	Eastern cottonwood, sweetgum, American sycamore, green ash.
						Eastern cottonwood	89	7	
						Sweetgum	85	6	
						Green ash	---	---	
						Shumard oak	---	---	
						Yellow birch	---	---	
						Hickory			

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Plant competi-tion	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc-tivity class*	Trees to plant
NhB, NhC-------- Nicholson	4D	Slight	Slight	Slight	Severe	Black oak----------- White oak----------- Hickory------------- Sweetgum------------ Yellow-poplar------- Northern red oak----	78 74 --- 84 --- ---	4 4 --- 6 --- ---	White oak, northern red oak, sweetgum, yellow-poplar, eastern white pine, white ash.
No-------------- Nolin	8A	Slight	Slight	Moderate	Severe	Yellow-poplar------- Sweetgum------------ Eastern cottonwood-- Black walnut-------- American sycamore--- River birch--------- Hickory------------- White oak-----------	107 92 --- --- --- --- --- ---	8 8 --- --- --- --- --- ---	Yellow-poplar, eastern white pine, eastern cottonwood, white ash, sweetgum, black walnut.
OtB, OtC-------- Otwell	3D	Slight	Slight	Slight	Moderate	White oak----------- Yellow-poplar------- Sugar maple--------- Black oak----------- Blackgum------------	65 --- --- --- ---	3 --- --- --- ---	Eastern white pine, yellow-poplar, white ash, white oak.
Se-------------- Sees	4C	Slight	Moderate	Moderate	Moderate	White oak----------- Black walnut-------- Yellow-poplar------- Shagbark hickory---- Hackberry----------- White ash----------- Sweetgum------------	85 --- --- --- --- --- ---	4 --- --- --- --- --- ---	White oak, yellow-poplar, white ash, eastern white pine.
ShC------------- Shelocta	4A	Slight	Slight	Slight	Severe	White oak----------- Yellow-poplar------- American beech------ Red maple----------- Scarlet oak--------- Hickory------------- Eastern white pine--	77 99 --- 81 80 --- ---	4 7 --- --- 4 --- ---	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
ShD------------- Shelocta	4R	Moderate	Moderate	Slight	Severe	White oak----------- Yellow-poplar------- American beech------ Red maple----------- Scarlet oak--------- Hickory------------- Eastern white pine--	77 99 --- 81 80 --- ---	4 7 --- --- 4 --- ---	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
SkF2------------ Shelocta (cool aspect)	3R	Moderate	Severe	Severe	Severe	White oak----------- Yellow-poplar------- American beech------ Red maple----------- Scarlet oak--------- Eastern white pine--	77 99 --- 81 80 ---	4 7 --- --- 4 ---	Yellow-poplar, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
SkF2------------ Shelocta (warm aspect)	4A	Moderate	Severe	Severe	Severe	White oak-----------	65	3	Shortleaf pine, white oak, eastern white pine.
						Black oak-----------	73	4	
						Scarlet oak---------	70	4	
						Yellow-poplar-------	90	6	
						American beech------	---	---	
						Blackgum------------	---	---	
						Red maple-----------	55	---	
SmB**:									
Shelocta-------	4A	Slight	Slight	Slight	Severe	White oak-----------	77	4	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
						Yellow-poplar-------	99	7	
						American beech------	---	---	
						Shortleaf pine------	77	9	
						Red maple-----------	81	---	
						Scarlet oak---------	80	4	
						American sycamore---	---	---	
Skidmore-------	8W	Slight	Slight	Slight	Moderate	Yellow-poplar-------	103	8	Yellow-poplar, white ash, eastern white pine, American sycamore, white oak, sweetgum.
						Sweetgum------------	---	---	
						American sycamore---	---	---	
						Eastern cottonwood--	---	---	
						Blackgum------------	---	---	
						White oak-----------	---	---	
						Black oak-----------	---	---	
SrB------------- Shrouts	6C	Moderate	Slight	Moderate	Moderate	Virginia pine-------	60	6	White oak.
						Scarlet oak---------	60	3	
						Black oak-----------	60	3	
						Eastern redcedar----	45	4	
						White oak-----------	---	---	
						Black locust--------	---	---	
						Hickory-------------	---	---	
SrD3------------ Shrouts	6R	Moderate	Moderate	Moderate	Moderate	Virginia pine-------	60	6	White oak.
						Scarlet oak---------	60	3	
						Black oak-----------	60	3	
						Eastern redcedar----	45	4	
						White oak-----------	---	---	
						Black locust--------	---	---	
						Hickory-------------	---	---	
SsC2**:									
Shrouts--------	6C	Moderate	Moderate	Moderate	Moderate	Virginia pine-------	60	6	White oak, hickory.
						Scarlet oak---------	60	3	
						Black oak-----------	60	3	
						Eastern redcedar----	45	4	
						White oak-----------	---	---	
						Black locust--------	---	---	
						Hickory-------------	---	---	
Beasley--------	3C	Slight	Slight	Slight	Severe	White oak-----------	61	3	White oak, white ash, hickory.
						Scarlet oak---------	---	---	
						Eastern redcedar----	41	3	
						Chinkapin oak-------	58	3	
						Hickory-------------	---	---	
						White ash-----------	63	---	
						Black locust--------	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Sx-------------- Skidmore	8W	Slight	Slight	Slight	Moderate	Yellow-poplar-------	103	8	Yellow-poplar, white ash, eastern white pine, American sycamore, white oak, sweetgum.
						Sweetgum------------	---	---	
						American sycamore---	---	---	
						Eastern cottonwood--	---	---	
						Blackgum------------	---	---	
						White oak-----------	---	---	
						Black oak-----------	---	---	
TsB, TsC-------- Tilsit	8A	Slight	Slight	Slight	Slight	White oak-----------	68	4	Eastern white pine, shortleaf pine, white oak, yellow-poplar.
						Yellow-poplar-------	90	6	
						Black oak-----------	74	4	
						Virginia pine-------	73	8	
						Scarlet oak---------	74	4	
						Hickory-------------	---	---	
						Red maple-----------	---	---	
						Pitch pine----------	67	---	
						Northern red oak----	---	---	
						Largetooth aspen----	---	---	
TtB------------- Trappist	7C	Slight	Slight	Slight	Moderate	Virginia pine-------	62	7	Virginia pine, white oak, northern red oak.
						White oak-----------	62	3	
						Hickory-------------	---	---	
						Black oak-----------	68	4	
						Red maple-----------	---	---	
						Chestnut oak--------	58	3	
						Scarlet oak---------	---	---	
						Northern red oak----	72	4	
WeB------------- Wheeling	4A	Slight	Slight	Slight	Severe	Northern red oak----	80	4	Eastern white pine, yellow-poplar, black walnut, white ash, northern red oak, shortleaf pine.
						Yellow-poplar-------	90	6	
						Silver maple--------	---	---	
WeC------------- Wheeling	4A	Moderate	Slight	Slight	Severe	Northern red oak----	80	4	Eastern white pine, yellow-poplar, black walnut, white ash, northern red oak, shortleaf pine.
						Yellow-poplar-------	90	6	
						Silver maple--------	---	---	
WnD**:									
Wheeling-------	4R	Moderate	Moderate	Slight	Severe	Northern red oak----	80	4	Eastern white pine, yellow-poplar, black walnut, white ash, northern red oak, shortleaf pine.
						Yellow-poplar-------	90	6	
						Silver maple--------	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
WnD**:									
Nolin----------	8A	Slight	Slight	Moderate	Severe	Yellow-poplar-------	107	8	Yellow-poplar, eastern white pine, eastern cottonwood, white ash, sweetgum, black walnut.
						Sweetgum------------	92	8	
						Eastern cottonwood--	---	---	
						Black walnut--------	---	---	
						American sycamore---	---	---	
						River birch---------	---	---	
						Hickory-------------	---	---	
						White oak-----------	---	---	
WoB, WoC-------- Woolper	4C	Slight	Moderate	Slight	Severe	Black oak-----------	75	4	Yellow-poplar, white ash, white oak, northern red oak, eastern white pine.
						Chinkapin oak-------	71	4	
						White ash-----------	---	---	
						Hickory-------------	---	---	
						Sugar maple---------	---	---	
						White oak-----------	---	---	
						Yellow buckeye------	---	---	
						Black walnut--------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 8.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaB: Aaron	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness.
AsB: Ashton	Slight	Slight	Moderate: slope.	Slight	Slight.
BaB: Beasley	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
BeC2: Beasley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
BhE2*:					
Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Shrouts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
BnF2*:					
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Brownsville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
BoF2*:					
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Brownsville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BrB: Blairton	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: droughty, depth to rock.
BrC2: Blairton	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness. percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: droughty, slope, depth to rock.
BrE2: Blairton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Bs----------- Boonesboro	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
BvF2*:					
Brownsville----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Berks----------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CaE2*:					
Caneyville-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Hagerstown-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
CeE2*:					
Caneyville-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Rock outcrop.					
ChB------------------ Chavies	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
ChC------------------ Chavies	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
CkF2*:					
Colyer---------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, depth to rock.
Trappist-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
CoB------------------ Covedale	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
CoC2----------------- Covedale	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
CsD2*:					
Covedale-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Shrouts--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
ClD2*:					
Covedale-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ClD2*:					
Trappist	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
ClF2*:					
Covedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Trappist	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
CxB Crider	Slight	Slight	Moderate: slope.	Slight	Slight.
EkB Elk	Slight	Slight	Moderate: slope.	Slight	Slight.
FaF2*:					
Fairmount	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: large stones, depth to rock.	Severe: erodes easily, slope.	Severe: large stones, depth to rock.
Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
GnD2 Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
GnE2 Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HgB Hagerstown	Slight	Slight	Moderate: slope.	Slight	Slight.
HgC Hagerstown	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Hn Haymond	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Kn Kinnick	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
LkB Lakin	Slight: slope, depth to rock.	Slight: slope, depth to rock.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
LkC Lakin	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: too sandy.	Moderate: slope, droughty.
LkE Lakin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Lw: Lawrence	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness	Moderate: wetness.
Mc: McGary	Severe: wetness, percs slowly.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Me: Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Mo: Morehead	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ne: Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
NhB: Nicholson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
NhC: Nicholson	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
No: Nolin	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
OtB: Otwell	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
OtC: Otwell	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Pt*. Pits, quarries					
Se: Sees	Severe: flooding.	Moderate: wetness, flooding.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, flooding.
ShC: Shelocta	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
ShD: Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
SkF2: Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SmB*:					
Shelocta	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Skidmore	Severe: flooding.	Moderate: small stones.	Moderate: flooding, small stones.	Slight	Moderate: flooding.
SrB Shrouts	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Moderate: depth to rock.
SrD3 Shrouts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
SsC2*:					
Shrouts	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
Beasley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Sx Skidmore	Severe: flooding.	Moderate: small stones.	Moderate: flooding, small stones.	Slight	Moderate: flooding.
TsB Tilsit	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
TsC Tilsit	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
TtB Trappist	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Slight	Moderate: depth to rock.
Ud*. Udorthents, smoothed					
WeB Wheeling	Slight	Slight	Moderate: slope.	Slight	Slight.
WeC Wheeling	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WnD*:					
Wheeling	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Nolin	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WoB------------------- Woolper	Severe: flooding.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight----------	Slight.
WoC------------------- Woolper	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
W*. Water					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 9.--Wildlife Habitat

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaB: Aaron	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AsB: Ashton	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
BaB: Beasley	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
BeC2: Beasley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BhE2*:										
Beasley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Shrouts	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BnF2*:										
Berks	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Brownsville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
BoF2*:										
Berks	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Brownsville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Shelocta	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
BrB: Blairton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BrC2: Blairton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BrE2: Blairton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Bs: Boonesboro	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
BvF2*:										
Brownsville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Berks	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
CaE2*:										
Caneyville	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hagerstown	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
CeE2*:										
Caneyville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
ChB Chavies	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChC Chavies	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CkF2*:										
Colyer	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Trappist	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CoB Covedale	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CoC2 Covedale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CsD2*:										
Covedale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Shrouts	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CtD2*:										
Covedale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Trappist	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CtF2*:										
Covedale	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Trappist	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CxB Crider	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
EkB---------------- Elk	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FaF2*:										
Fairmount----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Faywood-----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
GnD2--------------- Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
GnE2--------------- Gilpin	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
HgB---------------- Hagerstown	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HgC---------------- Hagerstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Hn----------------- Haymond	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Fair
Kn----------------- Kinnick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LkB, LkC----------- Lakin	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
LkE---------------- Lakin	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Lw----------------- Lawrence	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Mc----------------- McGary	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Me----------------- Melvin	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Mo----------------- Morehead	Fair	Good	Good	Good	---	Fair	Poor	Good	Good	Poor.
Ne----------------- Newark	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
NhB---------------- Nicholson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NhC---------------- Nicholson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
No----------------- Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
OtB: Otwell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OtC: Otwell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pt*. Pits, quarries										
Se: Sees	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ShC: Shelocta	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShD: Shelocta	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SkF2: Shelocta	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
SmB*:										
Shelocta	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Skidmore	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Fair	Very poor.
SrB: Shrouts	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SrD3: Shrouts	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SsC2*:										
Shrouts	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Beasley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sx: Skidmore	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TsB: Tilsit	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TsC: Tilsit	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TtB: Trappist	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ud*. Udorthents, smoothed										

See footnote at end of table.

Table 9.--Wildlife Habitat

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WeB---------------- Wheeling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WeC---------------- Wheeling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WnD*:										
Wheeling-----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Nolin--------------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WoB---------------- Woolper	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WoC---------------- Woolper	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
W*. Water										

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 10.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaB: Aaron	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
AsB: Ashton	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
BaB: Beasley	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
BeC2: Beasley	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
BhE2*:						
Beasley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Shrouts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
BnF2*:						
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Brownsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BoF2*:						
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Brownsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BrB: Blairton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: droughty, depth to rock.
BrC2: Blairton	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: droughty, slope, depth to rock.
BrE2: Blairton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Bs: Boonesboro	Severe: depth to rock.	Severe: flooding.	Severe: flooding, depth to rock.	Severe: flooding.	Severe: flooding.	Severe: flooding.
BvF2*:						
Brownsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CaE2*:						
Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
CeE2*:						
Caneyville	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
ChB: Chavies	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
ChC: Chavies	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
CkF2*:						
Colyer	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope,	Severe: slope, depth to rock.
Trappist	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CoB: Covedale	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
CoC2: Covedale	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
CsD2*:						
Covedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Shrouts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CtD2*, CtF2*:						
Covedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Trappist	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CxB Crider	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
EkB Elk	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
FaF2*:						
Fairmount	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: large stones, slope, depth to rock.
Faywood	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
GnD2 Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, depth to rock.
GnE2 Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HgB Hagerstown	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
HgC Hagerstown	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Hn Haymond	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Kn Kinnick	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, low strength.	Moderate: flooding.
LkB Lakin	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
LkC Lakin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
LkE Lakin	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lw Lawrence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Mc-------------- McGary	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Me-------------- Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Mo-------------- Morehead	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Ne-------------- Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
NhB------------- Nicholson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.
NhC------------- Nicholson	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
No-------------- Nolin	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
OtB------------- Otwell	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Slight.
OtC------------- Otwell	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
Pt*. Pits, quarries						
Se-------------- Sees	Severe: wetness.	Severe: flooding.	Severe: wetness, flooding.	Severe: flooding.	Severe: low strength.	Moderate: wetness, flooding.
ShC------------- Shelocta	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
ShD, SkF2------- Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Severe: slope.
SmB*:						
Shelocta-------	Slight---------	Slight---------	Slight---------	Moderate-------	Slight---------	Slight.
Skidmore-------	Moderate: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SrB------------- Shrouts	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: depth to rock.
SrD3------------ Shrouts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
SsC2*:						
Shrouts--------	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
Beasley--------	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Sx-------------- Skidmore	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
TsB------------- Tilsit	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: low strength.	Moderate: wetness.
TsC------------- Tilsit	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope, wetness.
TtB------------- Trappist	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: low strength.	Moderate: depth to rock.
Ud*. Udorthents, smoothed						
WeB------------- Wheeling	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
WeC------------- Wheeling	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
WnD*:						
Wheeling-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Nolin----------	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
WoB------------- Woolper	Moderate: too clayey.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
WoC------------- Woolper	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
W*. Water						

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 11.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaB: Aaron	Severe: wetness, percs slowly.	Moderate: depth to rock, wetness.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Severe: too clayey, hard to pack.
AsB: Ashton	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Slight	Moderate: too clayey.
BaB: Beasley	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Severe: too clayey, hard to pack.
BeC2: Beasley	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: too clayey, hard to pack.
BhE2*:					
Beasley	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, too clayey, hard to pack.
Shrouts	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
BnF2*:					
Berks	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, small stones, slope.
Brownsville	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Severe: small stones, slope.
BoF2*:					
Berks	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, small stones, slope.
Brownsville	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: small stones, slope.
Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BrB----------------- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, thin layer.
BrC2---------------- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, thin layer.
BrE2---------------- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, thin layer, slope.
Bs------------------ Boonesboro	Severe: flooding, depth to rock, poor filter.	Severe: seepage, depth to rock, flooding.	Severe: flooding, depth to rock, seepage.	Severe: flooding, depth to rock, seepage.	Severe: depth to rock, thin layer.
BvF2*:					
Brownsville--------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Severe: small stones, slope.
Berks--------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, small stones, slope.
CaE2*:					
Caneyville---------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: area reclaim, too clayey, hard to pack.
Hagerstown---------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Severe: too clayey, hard to pack, slope.
Rock outcrop.					
CeE2*:					
Caneyville---------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
Rock outcrop.					
ChB----------------- Chavies	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Slight.
ChC----------------- Chavies	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Moderate: slope.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CkF2*:					
Colyer	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, slope.
Trappist	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
CoB Covedale	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Slight.
CoC2 Covedale	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Moderate: slope.
CsD2*:					
Covedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Shrouts	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
CtD2*, CtF2*:					
Covedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Trappist	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
CxB Crider	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Moderate: too clayey.
EkB Elk	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight: slope.	Moderate: too clayey.
FaF2*:					
Fairmount	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
Faywood	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
GnD2 Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, thin layer.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GnE2: Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock, thin layer.
HgB: Hagerstown	Moderate: depth to rock, percs slowly.	Moderate: seepage, slope.	Severe: depth to rock, too clayey.	Slight	Severe: too clayey, hard to pack.
HgC: Hagerstown	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Severe: too clayey, hard to pack.
Hn: Haymond	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Slight.
Kn: Kinnick	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding.	Moderate: too clayey, wetness.
LkB: Lakin	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Severe: seepage, too sandy.
LkC: Lakin	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Severe: seepage, too sandy.
LkE: Lakin	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: slope, seepage, too sandy.	Severe: seepage, slope.	Severe: slope, seepage, too sandy.
Lw: Lawrence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Mc: McGary	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Severe: too clayey, hard to pack, wetness.
Me: Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.
Mo: Morehead	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ne: Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.
NhB: Nicholson	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: too clayey, hard to pack.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NhC----------------- Nicholson	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severs: wetness, slope.	Severe: too clayey, hard to pack.
No------------------ Nolin	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage,	Severe: flooding.	Moderate: too clayey,
OtB----------------- Otwell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: too clayey, wetness.
OtC----------------- Otwell	Severe: wetness, percs slowly.	Moderate: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Moderate: too clayey, slope, wetness.
Pt*. Pits, quarries					
Se------------------ Sees	Severe: wetness, percs slowly, flooding.	Severe: wetness, flooding.	Severe: depth to rock, wetness, flooding.	Severe: flooding.	Severe: too clayey, hard to pack.
ShC----------------- Shelocta	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Moderate: slope.
ShD, SkF2----------- Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.
SmB*:					
Shelocta-----------	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----------	Slight.
Skidmore-----------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, depth to rock, seepage.	Severe: flooding, seepage, wetness.	Severe: seepage, small stones.
SrB----------------- Shrouts	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Severe: depth to rock, too clayey, hard to pack.
SrD3---------------- Shrouts	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, hard to pack.
SsC2*:					
Shrouts------------	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Severe: depth to rock, too clayey, hard to pack.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SsC2*:					
Beasley	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Severe: too clayey, hard to pack.
Sx: Skidmore	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, depth to rock, seepage.	Severe: flooding, seepage.	Severe: seepage, small stones.
TsB: Tilsit	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Moderate: too clayey, wetness.
TsC: Tilsit	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness.	Moderate: slope, wetness, depth to rock.	Moderate: slope, too clayey, wetness.
TtB: Trappist	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Severe: depth to rock, too clayey, hard to pack.
Ud*. Udorthents, smoothed					
WeB: Wheeling	Moderate: percs slowly.	Moderate: slope.	Severe: seepage.	Slight	Moderate: too clayey.
WeC: Wheeling	Moderate: percs slowly, slope.	Severe: slope.	Severe: seepage.	Moderate: slope.	Moderate: slope, too clayey.
WnD*:					
Wheeling	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.
Nolin	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding.	Moderate: too clayey.
WoB: Woolper	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey, flooding.	Moderate: flooding.	Moderate: too clayey, hard to pack.
WoC: Woolper	Severe: percs slowly.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Severe: too clayey, hard to pack.
W*. Water					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 12.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AaB: Aaron	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AsB: Ashton	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
BaB, BeC2: Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BhE2*:				
Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Shrouts	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
BnF2*:				
Berks	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Brownsville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BoF2*:				
Berks	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Brownsville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Shelocta	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BrB, BrC2: Blairton	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, depth to rock, slope.
BrE2: Blairton	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Bs-------------------- Boonesboro	Poor: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones, thin layer.
BvF2*:				
Brownsville----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Berks----------------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CaE2*:				
Caneyville-----------	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Hagerstown-----------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
CeE2*:				
Caneyville-----------	Poor: depth to rock, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
ChB------------------- Chavies	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
ChC------------------- Chavies	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
CkF2*:				
Colyer---------------	Poor: slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, depth to rock, slope.
Trappist-------------	Poor: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CoB------------------- Covedale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CoC2------------------ Covedale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CsD2*:				
Covedale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Shrouts	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
CtD2*:				
Covedale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Trappist	Poor: depth to rock, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CtF2*:				
Covedale	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Trappist	Poor: depth to rock, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CxB Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
EkB Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
FaF2*:				
Fairmount	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, depth to rock, large stones.
Faywood	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
GnD2 Gilpin	Poor: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GnE2 Gilpin	Poor: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HgB, HgC Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Hn----------------- Haymond	Good----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
Kn----------------- Kinnick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
LkB---------------- Lakin	Good----------------	Probable------------	Improbable: too sandy.	Poor: too sandy.
LkC---------------- Lakin	Good----------------	Probable------------	Improbable: too sandy.	Poor: too sandy, slope.
LkE---------------- Lakin	Poor: slope.	Probable------------	Improbable: too sandy.	Poor: too sandy, slope.
Lw----------------- Lawrence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Mc----------------- McGary	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Me----------------- Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Mo----------------- Morehead	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ne----------------- Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
NhB---------------- Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
NhC---------------- Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
No----------------- Nolin	Good----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
OtB---------------- Otwell	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
OtC---------------- Otwell	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Pt*. Pits, quarries				

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Se-------------------- Sees	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
ShC------------------- Shelocta	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
ShD------------------- Shelocta	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
SkF2------------------ Shelocta	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
SmB*:				
Shelocta-------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Skidmore-------------	Fair: thin layer.	Improbable: small stones.	Probable-------------	Poor: small stones, area reclaim.
SrB------------------- Shrouts	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
SrD3------------------ Shrouts	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
SsC2*:				
Shrouts--------------	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Beasley--------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Sx-------------------- Skidmore	Fair: thin layer.	Improbable: small stones.	Improbable: excess fines.	Poor: small stones, area reclaim.
TsB------------------- Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
TsC------------------- Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
TtB------------------- Trappist	Poor: depth to rock. low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ud*. Udorthents, smoothed				

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
WeB----------------- Wheeling	Good----------------	Probable------------	Probable------------	Fair: too clayey.
WeC----------------- Wheeling	Good----------------	Probable------------	Probable------------	Fair: too clayey. slope.
WnD*:				
Wheeling------------	Fair: slope.	Probable------------	Probable------------	Poor: slope.
Nolin---------------	Good----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
WoB----------------- Woolper	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WoC----------------- Woolper	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
W*. Water				

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 13.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
AaB: Aaron	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack, wetness.	Slope	Erodes easily, wetness.	Erodes easily.
AsB: Ashton	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
BaB: Beasley	Moderate: depth to rock, slope.	Moderate: thin layer. hard to pack,	Deep to water	Erodes easily	Erodes easily.
BeC2: Beasley	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
BhE2*:					
Beasley	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Shrouts	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
BnF2*:					
Berks	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
Brownsville	Severe: seepage, slope.	Severe: piping, large stones.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
BoF2*:					
Berks	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
Brownsville	Severe: seepage, slope.	Severe: piping, large stones.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
Shelocta	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.
BrB: Blairton	Moderate: seepage, depth to rock, slope.	Severe: thin layer, piping.	Depth to rock, slope.	Depth to rock, erodes easily, wetness.	Depth to rock, erodes easily.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
BrC2, BrE2: Blairton	Severe: slope.	Severe: thin layer, piping	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, depth to rock, erodes easily.
Bs: Boonesboro	Severe: seepage.	Severe: thin layer, piping.	Deep to water	Depth to rock, erodes easily.	Depth to rock, erodes easily.
BvF2*:					
Brownsville	Severe: seepage, slope.	Severe: piping, large stones.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
Berks	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
CaE2*:					
Caneyville	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, depth to rock, erodes easily.
Hagerstown	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope	Slope.
Rock outcrop.					
CeE2*:					
Caneyville	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, depth to rock, erodes easily.
Rock outcrop.					
ChB: Chavies	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing	Favorable.
ChC: Chavies	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, soil blowing.	Slope.
CkF2*:					
Colyer	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, erodes easily, slope.	Slope, erodes easily, droughty.
Trappist	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
CoB: Covedale	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily.
CoC2: Covedale	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
CsD2*:					
Covedale	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Shrouts	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CtD2*:					
Covedale	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Trappist	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CtF2*:					
Covedale	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Trappist	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CxB Crider	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable	Favorable.
EkB Elk	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
FaF2*:					
Fairmount	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Faywood	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
GnD2, GnE2 Gilpin	Severe: slope.	Severe: thin layer, piping.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
HgB Hagerstown	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water	Favorable	Favorable.
HgC Hagerstown	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope	Slope.
Hn Haymond	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
Kn Kinnick	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
LkB: Lakin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Too sandy, soil blowing.	Droughty.
LkC, LkE: Lakin	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
Lw: Lawrence	Slight	Severe: piping.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
Mc: McGary	Slight	Severe: wetness.	Favorable	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Me: Melvin	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
Mo: Morehead	Moderate: seepage.	Severe: piping, wetness.	Favorable	Erodes easily, wetness.	Wetness, erodes easily.
Ne: Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
NhB: Nicholson	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
NhC: Nicholson	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
No: Nolin	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
OtB: Otwell	Moderate: slope.	Moderate: wetness.	Percs slowly, slope.	Erodes easily, wetness, percs slowly.	Erodes easily, rooting depth.
OtC: Otwell	Severe: slope.	Moderate: wetness.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Pt*. Pits, quarries					
Se: Sees	Moderate: depth to rock, slope.	Severe: hard to pack.	Slope, flooding.	Erodes easily, wetness, percs slowly.	Erodes easily.
ShC, ShD, SkF2: Shelocta	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
SmB*:					
Shelocta	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable	Favorable.
Skidmore	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, soil blowing.	Large stones, droughty.
SrB Shrouts	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, erodes easily.	Erodes easily, depth to rock.
SrD3 Shrouts	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
SsC2*:					
Shrouts	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Beasley	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Sx Skidmore	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, soil blowing.	Large stones, droughty.
TsB Tilsit	Moderate: depth to rock, slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
TsC Tilsit	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
TtB Trappist	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, erodes easily.	Erodes easily, depth to rock.
Ud*. Udorthents, smoothed					
WeB Wheeling	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
WeC Wheeling	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
WnD*:					
Wheeling	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Nolin	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
WoB---------------Woolper	Moderate: slope.	Moderate: hard to pack.	Deep to water----	Erodes easily----	Erodes easily.
WoC---------------Woolper	Severe: slope.	Moderate: hard to pack.	Deep to water----	Erodes easily, slope.	Slope, erodes easily.
W*. Water					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 14.--Engineering Index Properties

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AaB-------------- Aaron	0-8	Silt loam--------	CL-ML, CL	A-4, A-6	0	95-100	95-100	90-100	90-100	21-36	4-15
	8-45	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	90-100	90-100	85-100	80-100	44-71	22-43
	45-53	Silty clay, clay, channery silty clay.	CL, CH	A-7	0-10	75-90	75-90	70-90	65-90	44-66	22-39
	53	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
AsB-------------- Ashton	0-10	Silt loam--------	ML,	A-4	0	95-100	90-100	75-100	60-95	<35	NP-10
	10-62	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	80-100	25-42	5-20
BaB-------------- Beasley	0-8	Silt loam--------	ML, CL-ML	A-4	0-5	90-100	85-100	80-100	75-100	25-35	4-10
	8-33	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	33-42	Silty clay, clay, cherty silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	35-65	15-35
	42-53	Weathered bedrock	---	---	---	---	---	---	---	---	---
	53-57	Unweathered bedrock	---	---	---	---	---	---	---	---	---
BeC2------------- Beasley	0-5	Silt loam--------	ML, CL-ML	A-4	0-5	90-100	85-100	80-100	75-100	25-35	4-10
	5-30	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	30-42	Silty clay, clay, cherty silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	35-65	15-35
	42-53	Weathered bedrock	---	---	---	---	---	---	---	---	---
	53-57	Unweathered bedrock	---	---	---	---	---	---	---	---	---
BhE2*:											
Beasley---------	0-5	Silt loam--------	ML, CL-ML	A-4	0-5	90-100	85-100	80-100	75-100	25-35	4-10
	5-30	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	30-42	Silty clay, clay, cherty silty clay	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	35-65	15-35
	42-53	Weathered bedrock	---	---	---	---	---	---	---	---	---
	53-57	Unweathered bedrock	---	---	---	---	---	---	---	---	---
Shrouts---------	0-3	Silty clay loam	ML, CL-ML	A-4, A-6	0	100	90-100	85-100	80-100	24-40	4-12
	3-20	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	20-30	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	30-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
BnF2*:											
Berks	0-3	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	3-25	Channery loam, very channery loam, extremely channery loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Brownsville	0-4	Very channery silt loam, loam.	ML, CL-ML, GM, GM-GC	A-4	0-15	50-80	45-60	40-70	35-60	25-35	5-10
	4-43	Very channery silt loam, very channery loam, very flaggy silt loam.	ML, CL-ML, GM, GM-GC	A-1, A-2, A-4	5-40	35-80	30-70	20-60	25-60	25-35	5-10
	43-62	Channery silt loam, extremely channery loam, very flaggy silt loam.	GM, GP-GM, SM, SP-SM	A-1, A-2, A-4	15-60	25-65	20-55	15-50	10-45	20-35	2-10
	62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BoF2*:											
Berks	0-3	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	3-25	Channery loam, very channery loam, extremely channery loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Brownsville	0-4	Very channery silt loam, loam	ML, CL-ML, GM, GM-GC	A-4	0-15	50-80	45-60	40-70	35-60	25-35	5-10
	4-43	Very channery silt loam, very channery loam, very flaggy silt loam.	ML, CL-ML, GM, GM-GC	A-1, A-2, A-4	5-40	35-80	30-70	20-60	25-60	25-35	5-10
	43-62	Channery silt loam, extremely channery loam, very flaggy silt loam.	GM, GP-GM, SM, SP-SM	A-1, A-2, A-4	15-60	25-65	20-55	15-50	10-45	20-35	2-10
	62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Shelocta	0-8	Silt loam	ML, CL-ML	A-4	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	8-50	Loam, silt loam, gravelly loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-54	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
BrB-------------- Blairton	0-9	Silt loam--------	ML, CL-ML, CL	A-4	0	80-100	75-100	65-90	50-80	20-35	2-10
	9-35	Silt loam, gravelly silt loam, channery silty clay loam, very channery loam.	ML, CL, GM, GC	A-4, A-6, A-7, A-2	0-5	50-90	35-90	30-85	25-70	25-45	2-20
	35-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
BrC2, BrE2------- Blairton	0-5	Silt loam--------	ML, CL-ML, CL	A-4	0	80-100	75-100	65-90	50-80	20-35	2-10
	5-31	Silt loam, gravelly silt loam, channery silty clay loam, very channery loam.	ML, CL, GM, GC	A-4, A-6, A-7, A-2	0-5	50-90	35-90	30-85	25-70	25-45	2-20
	31-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Bs--------------- Boonesboro	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	90-100	85-100	80-100	70-95	25-35	3-11
	10-25	Gravelly silt loam, flaggy loam, very gravelly silty clay loam.	GM, GC, CL, CL-ML	A-2, A-4, A-6, A-7	0-20	50-75	40-70	35-65	25-60	25-42	3-20
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BvF2*:											
Brownsville-----	0-4	Very channery silt loam, loam.	ML, CL-ML, GM, GM-GC	A-4	0-15	50-80	45-60	40-70	35-60	25-35	5-10
	4-43	Very channery silt loam, very channery loam, very flaggy silt loam.	ML, CL-ML, GM, GM-GC	A-1, A-2, A-4	5-40	35-80	30-70	20-60	25-60	25-35	5-10
	43-62	Channery silt loam, extremely channery loam, very flaggy silt loam.	GM, GP-GM, SM, SP-SM	A-1, A-2, A-4	15-60	25-65	20-55	15-50	10-45	20-35	2-10
	62	Unweathered bedrock	---	---	---	---	---	---	---	---	---
Berks-----------	0-3	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	3-25	Channery loam, very channery loam, extremely channery loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	25	Unweathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CaE2*:											
Caneyville------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	7-31	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hagerstown------	0-4	Silt loam--------	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	4-62	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	62-66	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CeE2*:											
Caneyville------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	7-31	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
ChB, ChC---------- Chavies	0-8	Fine sandy loam.	SM, ML, CL-ML, SC-SM	A-4	0	85-100	75-100	40-90	40-75	<25	NP-5
	8-54	Fine sandy loam, silt loam, loam.	SM, ML	A-4	0	85-100	75-100	65-100	45-85	<35	NP-8
	54-66	Fine sandy loam, gravelly fine sandy loam, loamy fine sand.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1-B	0-5	70-100	60-95	40-85	20-75	<25	NP-5
CkF2*:											
Colyer----------	0-2	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	80-100	80-95	65-95	55-90	25-40	5-15
	2-12	Channery clay, very channery silty clay, very channery silty clay loam.	GC, GM	A-2, A-6, A-7	0-10	25-60	20-50	20-50	15-45	35-55	11-30
	12-19	Channery clay, very channery silty clay, very silty clay loam.	GC, GM	A-2, A-6, A-7	0-15	25-60	20-50	20-50	15-45	35-55	11-30
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CkF2*:											
Trappist	0-2	Silt loam	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	20-35	2-14
	2-20	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	20-30	Very channery clay, very channery silty clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CoB Covedale	0-17	Silt loam	ML, CL,	A-4, A-6	0	80-100	90-100	60-100	55-95	20-40	2-20
	7-67	Silty clay loam, clay, channery silty clay.	CL, CH,	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	67-71	Channery silty clay, very channery clay, clay.	MH, Ch, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
CoC2 Covedale	0-5	Silt loam	ML, CL,	A-4, A-6	0	80-100	90-100	60-100	55-95	20-40	2-20
	5-65	Silty clay loam, clay, channery silty clay.	CL, CH,	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	65-71	Channery silty clay, very channery clay, clay.	MH, Ch, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
CsD2*:											
Covedale	0-5	Silt loam	ML, CL,	A-4, A-6	0	80-100	90-100	60-100	55-95	20-40	2-20
	5-65	Silty clay loam, clay, channery silty clay.	CL, CH,	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	65-71	Channery silty clay, very channery clay, clay.	MH, Ch, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
Shrouts	0-3	Silty clay loam	ML, CL-ML	A-4, A-6	0	100	90-100	85-100	80-100	24-40	4-12
	3-20	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	20-30	Clay, silty clay, shaly silty clay	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	30-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
CtD2*, CtF2*:											
Covedale	0-5	Silt loam	ML, CL,	A-4, A-6	0	80-100	90-100	60-100	55-95	20-40	2-20
	5-65	Silty clay loam, clay, channery silty clay.	CL, CH,	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	65-71	Channery silty clay, very channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CtD2*, CtF2*:											
Trappist--------	0-2	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	20-35	2-14
	2-20	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	20-30	Very channery clay, very channery silty clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CxB-------------- Crider	0-17	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	3-12
	17-39	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6 A-4	0	100	95-100	90-100	85-100	25-42	3-20
	39-72	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
EkB-------------- Elk	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	8-66	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	5-15
	66-75	Silty clay loam, silty clay, clay.	ML, CL, CL-ML, SC-SM	A-4, A-6	0	75-100	50-100	45-100	40-95	25-40	5-15
FaF2*:											
Fairmount-------	0-4	Flaggy silty clay loam.	CL	A-6, A-7	8-50	80-100	70-100	65-100	60-95	35-45	15-22
	4-12	Flaggy silty clay loam, flaggy clay, flaggy silty clay.	CH, CL	A-7	8-50	80-100	70-100	65-100	60-100	40-70	20-40
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Faywood---------	0-4	Silty clay loam	ML, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
	4-26	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GnD2, GnE2------- Gilpin	0-5	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	5-11	Channery loam, loam, channery silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	11-32	Channery loam, very channery loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	32-36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
HgB, HgC--------- Hagerstown	0-8	Silt loam--------	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	8-62	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hn--------------- Haymond	0-6	Silt loam--------	CL, CL-ML, ML	A-4	0	100	100	90-100	85-100	20-30	3-10
	6-65	Silt loam--------	CL, CL-ML, ML	A-4	0	100	100	90-100	80-100	20-30	3-10
	65-95	Fine sandy loam, silt loam, loam	SM, ML, CL, SC	A-4, A-6	0	95-100	90-100	65-100	35-90	15-35	2-15
Kn--------------- Kinnick	0-6	Silt loam--------	CL, CL-ML,	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	9-55	Silt loam, silty clay loam.	CL, CL-ML,	A-4, A-6 A-7	0	100	95-100	85-95	65-100	25-46	5-23
	55-76	Silt loam, loam, silty clay loam, gravelly silt loam.	CL, CL-ML, ML, GM	A-4, A-6	0	50-100	50-100	40-95	35-95	15-30	NP-15
LkB, LkC, LkE---- Lakin	0-12	Loamy sand-------	SM, SC-SM	A-2	0	95-100	95-100	95-100	10-35	<30	NP-7
	12-58	Loamy sand, sand, loamy fine sand.	SM, SC-SM, SP-SM	A-2, A-3	0	95-100	95-100	90-100	5-35	<30	NP-7
	58-96	Sand, sandy loam, gravelly sand.	SM, SC-SM, GM, SP-SM	A-1, A-2, A-3	0	40-100	35-100	20-80	5-25	<30	NP-7
Lw--------------- Lawrence	0-9	Silt loam--------	ML	A-4	0	100	95-100	90-100	80-100	25-35	2-10
	9-19	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	19-44	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	44-61	Clay, silty clay loam, silt loam.	ML, CL, MH, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	75-100	25-60	5-25
	61-64	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mc--------------- McGary	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-15
	10-36	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-100	45-60	25-35
	36-61	Stratified silty clay loam to clay.	CL, CH	A-6, A-7	0	95-100	95-100	95-100	85-100	35-55	20-35
	61-64	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Me--------------- Melvin	0-7	Silt loam--------	CL, CL-ML,	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	7-21	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-98	25-40	5-20
	21-70	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-98	25-40	5-20
Mo--------------- Morehead	0-9	Silt loam--------	ML	A-4	0	95-100	95-100	90-100	80-100	25-35	2-10
	9-42	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	75-100	25-40	5-20
	42-62	Silt loam, silty clay, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	70-100	60-95	20-40	2-20

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Ne--------------- Newark	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	8-26	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	26-62	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
NhB, NhC--------- Nicholson	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	80-95	25-35	5-10
	8-24	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	85-100	85-100	80-100	25-45	5-20
	24-42	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	90-100	80-100	75-100	25-45	5-20
	42-61	Silty clay loam, silty clay, clay	CH, CL	A-6, A-7	0-10	80-100	70-100	60-100	55-100	34-70	16-40
	61	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
No--------------- Nolin	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	7-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	60-65	Loam, silt loam, gravelly loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
OtB, OtC--------- Otwell	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-35	5-15
	9-29	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	100	100	95-100	70-95	25-40	5-20
	29-65	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	85-100	65-90	35-50	20-30
Pt*. Pits, quarries											
Se--------------- Sees	0-15	Silt loam--------	ML, CL	A-6, A-7	0-15	90-100	90-100	80-100	70-90	30-45	12-25
	15-40	Silty clay, clay, silty clay loam.	CH, MH, CL	A-7, A-6	0-15	90-100	90-100	85-100	80-95	35-70	20-40
	40-62	Silty clay, clay.	CH, MH, CL	A-7	0-30	80-100	80-100	75-100	70-95	45-75	25-45
ShC, ShD--------- Shelocta	0-10	Gravelly silt loam.	ML, GM, SM	A-4	0-10	55-95	50-80	40-70	36-65	<35	NP-10
	10-52	Silty clay loam, silt loam, loam, gravelly loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	52-56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SkF2------------- Shelocta	0-8	Gravelly silt loam.	ML, GM, SM	A-4	0-10	55-95	50-80	40-70	36-65	<35	NP-10
	8-50	Silty clay loam, silt loam, loam, gravelly loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
SmB*:											
Shelocta--------	0-10	Silt loam--------	ML, GM, SM	A-4	0-10	55-95	50-80	40-70	36-65	<35	NP-10
	10-52	Silty clay loam, silt loam, loam, gravelly loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	52-56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Skidmore--------	0-6	Gravelly silt loam.	GM, SM, ML	A-4, A-2	0-10	60-90	50-85	40-75	25-60	<30	NP-7
	6-72	Gravelly loam, very gravelly silt loam, extremely gravelly loam.	GM, GP-GM	A-2, A-1	5-30	35-60	20-50	15-40	10-35	<30	NP-5
SrB-------------- Shrouts	0-6	Silty clay loam	ML, CL-ML	A-4, A-6	0	100	90-100	85-100	80-100	24-40	4-12
	6-23	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	23-33	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	33-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
SrD3------------- Shrouts	0-2	Silty clay loam	ML, CL-ML	A-4, A-6	0	100	90-100	85-100	80-100	24-40	4-12
	2-19	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	19-29	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	29-39	Weathered bedrock	---	---	---	---	---	---	---	---	---
SsC2*:											
Shrouts---------	0-3	Silty clay loam	ML, CL-ML	A-4, A-6	0	100	90-100	85-100	80-100	24-40	4-12
	3-20	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	20-30	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	30-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Beasley---------	0-5	Silt loam--------	ML, CL-ML	A-4	0-5	90-100	85-100	80-100	75-100	25-35	4-10
	5-30	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	30-42	Silty clay, clay, cherty silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	35-65	15-35
	42-53	Weathered bedrock	---	---	---	---	---	---	---	---	---
	53-57	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sx-------------- Skidmore	0-6	Gravelly silt loam.	GM, SM, ML	A-4, A-2	0-10	60-90	50-85	40-75	25-60	<30	NP-7
	6-72	Gravelly loam, very gravelly silt loam, extremely gravelly loam.	GM, GP-GM	A-2, A-1	5-30	35-60	20-50	15-40	10-35	<30	NP-5

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
TsB, TsC--------- Tilsit	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-100	20-35	4-15
	9-23	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	65-100	25-40	5-20
	23-43	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	75-100	65-100	25-45	5-25
	43-47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TtB-------------- Trappist	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	20-35	2-14
	6-24	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	24-34	Very channery clay, very channery silty clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ud*. Udorthents, smoothed											
WeB, WeC--------- Wheeling	0-9	Loam-------------	ML, CL, SM, SC	A-4	0	90-100	90-100	85-100	45-90	15-35	NP-10
	9-64	Loam, sandy clay loam, fine sandy loam, loamy fine sand.	ML, CL, SM, SC	A-4, A-6	0-5	90-100	70-100	65-100	45-80	20-40	2-20
	64-69	Stratified fine sandy loam.	GM, SM, GP, GW	A-1, A-2, A-3, A-4	10-20	35-90	20-75	10-65	4-45	<20	NP-10
WnD*: Wheeling--------	0-9	Silt loam--------	ML, CL, SM, SC	A-4	0	90-100	90-100	85-100	45-90	15-35	NP-10
	9-64	Loam, sandy clay loam, fine sandy loam, loamy fine sand.	ML, CL, SM, SC	A-4, A-6	0-5	90-100	70-100	65-100	45-80	20-40	2-20
	64-69	Stratified fine sandy loam.	GM, SM, GP, GW	A-1, A-2, A-3, A-4	10-20	35-90	20-75	10-65	4-45	<20	NP-10
Nolin-----------	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	7-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	60-65	Loam, silt loam, gravelly loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
WoB, WoC--------- Woolper	0-10	Silty clay loam--	CL, CL-ML	A-4, A-6	0-10	95-100	90-100	85-100	75-100	25-35	6-15
	10-45	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	90-100	85-100	75-100	35-65	15-40
	45-62	Clay, channery clay, silty clay	CH, CL	A-7, A-6	0-10	95-100	80-100	85-100	75-100	45-75	20-45
W*. Water											

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 15.--Physical and Chemical Properties of the Soils

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AaB--------------	0-8	10-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.8	Low----------	0.37	3	1-3
Aaron	8-45	35-65	1.30-1.60	0.06-0.2	0.14-0.18	5.1-7.8	Moderate-----	0.28		
	45-53	35-65	1.50-1.60	0.06-0.2	0.12-0.16	5.6-7.8	Moderate-----	0.28		
	53	---	---	---	---	---	-------------	----		
AsB--------------	0-10	10-25	1.20-1.40	0.6-2.0	0.16-0.23	5.6-7.3	Low----------	0.32	5	2-4
Ashton	10-62	18-35	1.20-1.50	0.6-2.0	0.18-0.23	5.6-7.3	Low----------	0.43		
BaB--------------	0-8	10-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.43	4-3	.5-4
Beasley	8-33	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	33-42	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-8.4	Moderate-----	0.28		
	42-53	---	---	---	---	---	-------------	----		
	53-57	---	---	---	---	---	-------------	----		
BeC2-------------	0-5	10-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.43	4-3	.5-4
Beasley	5-30	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	30-42	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-8.4	Moderate-----	0.28		
	42-53	---	---	---	---	---	-------------	----		
	53-57	---	---	---	---	---	-------------	----		
BhE2*:										
Beasley----------	0-5	10-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.43	4-3	.5-4
	5-30	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	30-42	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-8.4	Moderate-----	0.28		
	42-53	---	---	---	---	---	-------------	----		
	53-57	---	---	---	---	---	-------------	----		
Shrouts----------	0-3	27-40	1.40-1.55	0.06-0.2	0.15-0.20	5.1-8.4	Low----------	0.32	3-2	.5-3
	3-20	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate-----	0.37		
	20-30	40-65	1.40-1.80	<0.06	0.08-0.14	5.1-8.4	Moderate-----	0.37		
	30-40	---	---	---	---	---	-------------	----		
BnF2*:										
Berks------------	0-3	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.17	3-2	2-4
	3-25	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	25	---	---	---	---	---	-------------	----		
Brownsville------	0-4	8-18	1.20-1.45	0.6-6.0	0.09-0.17	3.6-6.5	Low----------	0.20	4	1-3
	4-43	8-18	1.30-1.60	0.6-6.0	0.07-0.14	3.6-5.5	Low----------	0.17		
	43-62	8-18	1.30-1.60	2.0-6.0	0.03-0.12	3.6-6.0	Low----------	0.17		
	62	---	---	---	---	---	-------------	----		
BoF2*:										
Berks------------	0-3	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.17	3-2	2-4
	3-25	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	25	---	---	---	---	---	-------------	----		
Brownsville------	0-4	8-18	1.20-1.45	0.6-6.0	0.09-0.17	3.6-6.5	Low----------	0.20	4	1-3
	4-43	8-18	1.30-1.60	0.6-6.0	0.07-0.14	3.6-5.5	Low----------	0.17		
	43-62	8-18	1.30-1.60	2.0-6.0	0.03-0.12	3.6-6.0	Low----------	0.17		
	62	---	---	---	---	---	-------------	----		
Shelocta---------	0-8	10-25	1.15-1.30	0.6-2.0	0.16-0.22	4.5-5.5	Low----------	0.32	3	.5-5
	8-50	18-35	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.28		
	50-54	---	---	---	---	---	-------------	----		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BrB-------------	0-9	10-27	1.00-1.30	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.43	3	2-4
Blairton	9-35	18-35	1.30-1.50	0.2-0.6	0.08-0.14	3.6-5.5	Low----------	0.32		
	35-42	---	---	---	---	---	-------------	----		
BrC2, BrE2-------	0-5	10-27	1.00-1.30	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.43	3	2-4
Blairton	5-31	18-35	1.30-1.50	0.2-0.6	0.08-0.14	3.6-5.5	Low----------	0.32		
	31-38	---	---	---	---	---	-------------	----		
Bs---------------	0-10	15-27	1.20-1.40	0.6-2.0	0.18-0.23	6.1-8.4	Low----------	0.37	2	3-5
Boonesboro	10-25	18-35	1.20-1.40	6.0-20	0.06-0.12	6.1-8.4	Low----------	0.17		
	25	---	---	---	---	---	-------------	----		
BvF2*:										
Brownsville-----	0-4	8-18	1.20-1.45	0.6-6.0	0.09-0.17	3.6-6.5	Low----------	0.20	4	1-3
	4-43	8-18	1.30-1.60	0.6-6.0	0.07-0.14	3.6-5.5	Low----------	0.17		
	43-62	8-18	1.30-1.60	2.0-6.0	0.03-0.12	3.6-6.0	Low----------	0.17		
	62	---	---	---	---	---	-------------	----		
Berks-----------	0-3	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.17	3-2	2-4
	3-25	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	25	---	---	---	---	---	-------------	----		
CaE2*:										
Caneyville------	0-7	10-25	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	2	2-4
	7-31	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	31	---	---	---	---	---	-------------	----		
Hagerstown------	0-4	15-27	1.20-1.40	0.6-6.0	0.16-0.24	4.5-6.5	Low----------	0.32	5-4	1-5
	4-62	35-60	1.20-1.60	0.6-2.0	0.10-0.24	5.1-7.3	Moderate-----	0.28		
	62-66	---	---	---	---	---	-------------	----		
Rock outcrop.										
CeE2*:										
Caneyville------	0-7	10-25	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low----------	0.43	2	2-4
	7-31	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	31	---	---	---	---	---	-------------	----		
Rock outcrop.										
ChB, ChC---------	0-8	7-18	1.20-1.40	2.0-6.0	0.11-0.18	4.5-7.3	Low----------	0.24	5	.5-4
Chavies	8-54	7-18	1.20-1.40	2.0-6.0	0.11-0.20	4.5-7.3	Low----------	0.24		
	54-66	7-18	1.30-1.50	2.0-6.0	0.08-0.18	4.5-6.0	Low----------	0.24		
CkF2*:										
Colyer----------	0-2	15-27	1.20-1.50	0.6-2.0	0.15-0.21	3.6-6.0	Low----------	0.37	1	.5-2
	2-12	35-59	1.30-1.60	0.06-0.2	0.03-0.10	3.6-5.0	Low----------	0.17		
	12-19	35-59	1.30-1.60	0.06-0.2	0.03-0.10	3.6-5.0	Low----------	0.17		
	19	---	---	---	---	---	-------------	----		
Trappist--------	0-2	7-27	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low----------	0.37	2-1	1-3
	2-20	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	20-30	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	30	---	---	---	---	---	-------------	----		
CoB--------------	0-7	12-27	1.20-1.40	0.6-2.0	0.16-0.22	3.5-5.0	Low----------	0.35	5	1-3
Covedale	7-67	18-35	1.20-1.60	0.6-2.0	0.10-0.16	3.5-5.0	Moderate-----	0.43		
	67-71	40-60	1.40-1.65	0.6-2.0	0.08-0.14	3.5-5.0	Moderate-----	0.29		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
CoC2------------- Covedale	0-5	12-27	1.20-1.40	0.6-2.0	0.16-0.22	3.5-5.0	Low----------	0.35	5	1-3
	5-65	18-35	1.20-1.60	0.6-2.0	0.10-0.16	3.5-5.0	Moderate-----	0.43		
	65-71	40-60	1.40-1.65	0.6-2.0	0.08-0.14	3.5-5.0	Moderate-----	0.29		
CsD2*:										
Covedale--------	0-5	12-27	1.20-1.40	0.6-2.0	0.16-0.22	3.5-5.0	Low----------	0.35	5	1-3
	5-65	18-35	1.20-1.60	0.6-2.0	0.10-0.16	3.5-5.0	Moderate-----	0.43		
	65-71	40-60	1.40-1.65	0.6-2.0	0.08-0.14	3.5-5.0	Moderate-----	0.29		
Shrouts---------	0-3	27-40	1.40-1.55	0.06-0.2	0.15-0.20	5.1-8.4	Low----------	0.32	3-2	.5-3
	3-20	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate-----	0.37		
	20-30	40-65	1.40-1.80	<0.06	0.08-0.14	5.1-8.4	Moderate-----	0.37		
	30-40	---	---	---	---	---	-------------	----		
CtD2*, CtF2*:										
Covedale--------	0-5	12-27	1.20-1.40	0.6-2.0	0.16-0.22	3.5-5.0	Low----------	0.35	5	1-3
	5-65	18-35	1.20-1.60	0.6-2.0	0.10-0.16	3.5-5.0	Moderate-----	0.43		
	65-71	40-60	1.40-1.65	0.6-2.0	0.08-0.14	3.5-5.0	Moderate-----	0.29		
Trappist--------	0-2	7-27	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low----------	0.37	2-1	1-3
	2-20	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	20-30	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	30	---	---	---	---	---	-------------	----		
CxB-------------- Crider	0-17	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	5	2-4
	17-39	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low----------	0.28		
	39-72	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.28		
EkB-------------- Elk	0-8	10-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low----------	0.32	5	.5-3
	8-66	18-35	1.20-1.50	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.28		
	66-75	15-40	1.20-1.50	0.6-2.0	0.14-0.20	4.5-7.8	Low----------	0.28		
FaF2*:										
Fairmount-------	0-4	27-40	1.20-1.40	0.06-0.6	0.12-0.20	6.6-8.4	Moderate-----	0.37	1-1	3-7
	4-12	35-60	1.40-1.60	0.06-0.6	0.10-0.18	6.6-8.4	Moderate-----	0.37		
	12	---	---	---	---	---	-------------	----		
Faywood---------	0-4	27-40	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37	2	1-4
	4-26	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.3	Moderate-----	0.28		
	26	---	---	---	---	---	-------------	----		
GnD2, GnE2------- Gilpin	0-5	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.32	3-2	.5-4
	5-11	18-27	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	11-32	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.24		
	32-36	---	---	---	---	---	-------------	----		
HgB, HgC--------- Hagerstown	0-8	15-27	1.20-1.40	0.6-6.0	0.16-0.24	4.5-6.5	Low----------	0.32	5-4	1-5
	8-62	35-60	1.20-1.60	0.6-2.0	0.10-0.24	5.1-7.3	Moderate-----	0.28		
	62-66	---	---	---	---	---	-------------	----		
Hn--------------- Haymond	0-6	10-20	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.8	Low----------	0.49	5	1-3
	6-65	10-18	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.8	Low----------	0.55		
	65-95	5-26	1.30-1.50	0.6-2.0	0.14-0.22	6.1-7.8	Low----------	0.43		
Kn--------------- Kinnick	0-9	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	2-4
	9-55	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		
	55-76	10-30	1.30-1.55	0.6-2.0	0.10-0.23	5.1-8.4	Low----------	0.43		
LkB, LkC, LkE---- Lakin	0-12	2-6	1.20-1.40	6.0-20	0.06-0.10	4.5-6.0	Low----------	0.17	5	1-2
	12-58	3-8	1.30-1.50	6.0-20	0.04-0.08	4.5-6.0	Low----------	0.17		
	58-96	1-3	1.30-1.50	6.0-20	0.04-0.08	4.5-6.0	Low----------	0.17		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Lw----------------	0-9	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low-----------	0.43	4	1-4
Lawrence	9-19	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low-----------	0.37		
	19-44	18-35	1.50-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low-----------	0.43		
	44-61	18-35	1.50-1.70	0.06-0.6	0.08-0.12	4.5-7.3	Low-----------	0.37		
	61	---	---	---	---	---	-------------	----		
Mc----------------	0-10	22-27	1.35-1.50	0.6-2.0	0.22-0.24	6.1-7.3	Low-----------	0.43	3-2	1-4
McGary	10-36	35-50	1.60-1.70	0.06-0.2	0.11-0.13	5.6-7.8	Moderate------	0.32		
	36-61	35-50	1.55-1.65	<0.2	0.14-0.16	7.3-8.4	Moderate------	0.32		
	61-65	---	---	---	---	---	-------------	----		
Me----------------	0-7	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low-----------	0.43	5	.5-3
Melvin	7-21	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low-----------	0.43		
	21-70	7-40	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low-----------	0.43		
Mo----------------	0-9	12-27	1.20-1.50	0.6-2.0	0.19-0.23	4.5-5.5	Low-----------	0.37	4	1-4
Morehead	9-42	12-35	1.20-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low-----------	0.43		
	42-62	7-40	1.20-1.50	0.6-2.0	0.15-0.22	4.5-5.5	Low-----------	0.43		
Ne----------------	0-8	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low-----------	0.43	5	1-4
Newark	8-26	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low-----------	0.43		
	26-62	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low-----------	0.43		
NhB, NhC----------	0-8	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low-----------	0.43	4-3	2-4
Nicholson	8-24	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low-----------	0.43		
	24-42	18-35	1.50-1.70	0.06-0.2	0.07-0.12	4.5-6.5	Low-----------	0.43		
	42-61	35-60	1.40-1.60	0.06-0.2	0.07-0.12	5.1-7.8	Moderate------	0.37		
	61	---	---	---	---	---	-------------	----		
No----------------	0-7	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low-----------	0.43	5	2-4
Nolin	7-60	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low-----------	0.43		
	60-65	10-30	1.30-1.55	0.6-2.0	0.10-0.23	5.1-8.4	Low-----------	0.43		
OtB, OtC----------	0-9	18-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.43	4	.5-2
Otwell	9-29	22-35	1.30-1.45	0.2-0.6	0.18-0.22	4.5-5.5	Low-----------	0.43		
	29-65	18-30	1.60-1.80	<0.06	0.06-0.08	4.5-5.5	Moderate------	0.43		
Pt*.										
Pits, quarries										
Se----------------	0-15	20-27	1.20-1.40	0.2-2.0	0.17-0.22	5.6-8.4	Low-----------	0.37	3	2-5
Sees	15-40	35-50	1.40-1.60	0.06-0.2	0.11-0.20	5.6-8.4	Moderate------	0.28		
	40-62	40-60	1.50-1.60	0.06-0.2	0.10-0.15	5.6-8.4	Moderate------	0.28		
ShC, ShD----------	0-10	10-25	1.15-1.30	0.6-2.0	0.10-0.18	4.5-5.5	Low-----------	0.28	3	.5-5
Shelocta	10-52	18-35	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low-----------	0.28		
	52-56	---	---	---	---	---	-------------	----		
SkF2--------------	0-8	10-25	1.15-1.30	0.6-2.0	0.10-0.18	4.5-5.5	Low-----------	0.28	3	.5-5
Shelocta	8-50	18-35	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low-----------	0.28		
	50-54	---	---	---	---	---	-------------	----		
SmB*:										
Shelocta---------	0-10	10-25	1.15-1.30	0.6-2.0	0.10-0.18	4.5-5.5	Low-----------	0.28	3	.5-5
	10-52	18-35	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low-----------	0.28		
	52-56	---	---	---	---	---	-------------	----		
Skidmore---------	0-6	7-18	1.20-1.40	2.0-6.0	0.07-0.13	5.6-7.8	Low-----------	0.17	3	<2
	6-72	7-18	1.30-1.60	2.0-6.0	0.04-0.10	5.6-7.8	Low-----------	0.17		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
SrB-------------- Shrouts	0-6	27-40	1.40-1.55	0.06-0.2	0.15-0.20	5.1-8.4	Low----------	0.32	3-2	.5-3
	6-23	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate-----	0.37		
	23-33	40-65	1.40-1.80	<0.06	0.08-0.14	5.1-8.4	Moderate-----	0.37		
	33-40	---	---	---	---	---	-------------	----		
SrD3------------- Shrouts	0-2	27-40	1.40-1.55	0.06-0.2	0.15-0.20	5.1-8.4	Low----------	0.32	3-2	.5-3
	2-19	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate-----	0.37		
	19-29	40-65	1.40-1.80	<0.06	0.08-0.14	5.1-8.4	Moderate-----	0.37		
	29-39	---	---	---	---	---	-------------	----		
SsC2*:										
Shrouts---------	0-3	27-40	1.40-1.55	0.06-0.2	0.15-0.20	5.1-8.4	Low----------	0.32	3-2	.5-3
	3-20	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate-----	0.37		
	20-30	40-65	1.40-1.80	<0.06	0.08-0.14	5.1-8.4	Moderate-----	0.37		
	30-40	---	---	---	---	---	-------------	----		
Beasley---------	0-5	10-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.43	4-3	.5-4
	5-30	40-60	1.30-1.55	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.28		
	30-42	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-8.4	Moderate-----	0.28		
	42-53	---	---	---	---	---	-------------	----		
	53-57	---	---	---	---	---	-------------	----		
Sx--------------- Skidmore	0-6	7-18	1.20-1.40	2.0-6.0	0.07-0.13	5.6-7.8	Low----------	0.17	3	<2
	6-72	7-18	1.30-1.60	2.0-6.0	0.04-0.10	5.6-7.8	Low----------	0.17		
TsB, TsC--------- Tilsit	0-9	10-25	1.20-1.55	0.6-2.0	0.16-0.22	3.6-5.5	Low----------	0.43	3-2	1-3
	9-23	18-35	1.30-1.55	0.6-2.0	0.16-0.22	3.6-5.5	Low----------	0.43		
	23-43	18-35	1.40-1.65	0.06-0.2	0.08-0.12	3.6-5.5	Low----------	0.43		
	43-47	---	---	---	---	---	-------------	----		
TtB-------------- Trappist	0-6	7-27	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low----------	0.37	2-1	1-3
	6-24	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	24-34	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	34	---	---	---	---	---	-------------	----		
Ud*. Udorthents, smoothed										
WeB, WeC--------- Wheeling	0-9	12-20	1.20-1.40	0.6-6.0	0.12-0.18	5.1-6.5	Low----------	0.37	5-4	1-3
	9-64	18-30	1.30-1.50	0.6-2.0	0.08-0.16	5.1-6.0	Low----------	0.32		
	64-69	8-15	1.30-1.50	6.0-20	0.04-0.08	5.1-6.0	Low----------	0.20		
WnD*:										
Wheeling--------	0-9	12-20	1.20-1.40	0.6-6.0	0.12-0.18	5.1-6.5	Low----------	0.37	5-4	1-3
	9-64	18-30	1.30-1.50	0.6-2.0	0.08-0.16	5.1-6.0	Low----------	0.32		
	64-69	8-15	1.30-1.50	6.0-20	0.04-0.08	5.1-6.0	Low----------	0.20		
Nolin-----------	0-7	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	2-4
	7-60	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43		
	60-65	10-30	1.30-1.55	0.6-2.0	0.10-0.23	5.1-8.4	Low----------	0.43		
WoB, WoC--------- Woolper	0-10	15-27	1.30-1.50	0.6-2.0	0.18-0.22	6.1-7.8	Low----------	0.37	4	4-6
	10-45	36-50	1.30-1.55	0.2-2.0	0.13-0.19	6.1-7.8	Moderate-----	0.28		
	45-62	40-60	1.45-1.65	0.06-0.6	0.12-0.17	6.1-7.8	Moderate-----	0.28		
W*. Water										

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 16.--Soil and Water Features

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
AaB---------------- Aaron	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	40-60	Hard	High-----	Moderate.
AsB---------------- Ashton	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Low.
BaB, BeC2---------- Beasley	C	None--------	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate.
BhE2*:											
Beasley----------	C	None--------	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate.
Shrouts----------	D	None--------	---	---	>6.0	---	---	20-40	Soft	High-----	Low.
BnF2*:											
Berks------------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
Brownsville------	C	None--------	---	---	>6.0	---	---	40-72	Hard	Low------	High.
BoF2*:											
Berks------------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
Brownsville------	C	None--------	---	---	>6.0	---	---	40-72	Hard	Low------	High.
Shelocta---------	B	None--------	---	---	>6.0	---	---	>40	Soft	Low------	High.
BrB, BrC2, BrE2--- Blairton	C	None--------	---	---	1.5-2.5	---	---	20-40	Soft	High-----	High.
Bs---------------- Boonesboro	B	Frequent----	Brief-----	Jan-Apr	>6.0	---	---	20-40	Hard	Low------	Low.
BvF2*:											
Brownsville------	C	None--------	---	---	>6.0	---	---	40-72	Hard	Low------	High.
Berks------------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
CaE2*:											
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Hagerstown-------	C	None--------	---	---	>6.0	---	---	60-84	Hard	Moderate	Low.
Rock outcrop.											
CeE2*:											
Caneyville-------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Rock outcrop.											
ChB, ChC---------- Chavies	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
CkF2*:											
Colyer-----------	D	None--------	---	---	>6.0	---	---	8-20	Hard	High-----	High.
Trappist---------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	High.

See footnote at end of table.

Table 16.--Soil and Water Features--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
CoB, CoC2: Covedale	B	None	---	---	>6.0	---	---	>60	Soft	High	High.
CsD2*:											
Covedale	B	None	---	---	>6.0	---	---	>60	Soft	High	High.
Shrouts	D	None	---	---	>6.0	---	---	20-40	Soft	High	Low.
CtD2*, CtF2*:											
Covedale	B	None	---	---	>6.0	---	---	>60	Soft	High	High.
Trappist	C	None	---	---	>6.0	---	---	20-40	Hard	High	High.
CxB: Crider	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
EkB: Elk	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FaF2*:											
Fairmount	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
Faywood	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
GnD2, GnE2: Gilpin	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
HgB, HgC: Hagerstown	C	None	---	---	>6.0	---	---	60-84	Hard	Moderate	Low.
Hn: Haymond	B	Frequent	Brief	Jan-May	>6.0	---	---	>60	---	Low	Low.
Kn: Kinnick	B	Occasional	Brief	Feb-May	3.5-6.0	Apparent	Feb-Mar	>60	---	Low	Moderate.
LkB, LkC, LkE: Lakin	A	None	---	---	>6.0	---	---	>60	---	Low	High.
Lw: Lawrence	C	None	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High	High.
Mc: McGary	C	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High	Low.
Me: Melvin	D	Frequent	Brief	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High	Low.
Mo: Morehead	C	Rare	Brief	Dec-May	0.5-2.5	Apparent	Dec-Apr	>60	---	Moderate	High.
Ne: Newark	C	Occasional	Brief	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High	Low.
NhB, NhC: Nicholson	C	None	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	High	Moderate.
No: Nolin	B	Occasional	Brief	Feb-May	>6.0	---	---	>60	---	Low	Moderate.

See footnote at end of table.

Table 16.--Soil and Water Features--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard- ness	Uncoated steel	Concrete
					Ft			In			
OtB, OtC---------- Otwell	C	None--------	---	---	2.0-3.5	Perched	Jan-Apr	>60	---	Moderate	High.
Pt*. Pits, quarries											
Se---------------- Sees	C	Rare--------	Brief-----	Dec-May	1.5-2.0	Perched	Jan-Apr	>60	Hard	Moderate	Low.
ShC, ShD, SkF2---- Shelocta	B	None--------	---	---	>6.0	---	---	>40	Hard	Low------	High.
SmB*:											
Shelocta---------	B	None--------	---	---	>6.0	---	---	>40	Hard	Low------	High.
Skidmore---------	B	Occasional	Very brief	Dec-May	3.0-4.0	Apparent	Dec-Mar	>60	Hard	Low------	Moderate.
SrB, SrD3--------- Shrouts	D	None--------	---	---	>6.0	---	---	20-40	Soft	High-----	Low.
SsC2*:											
Shrouts----------	D	None--------	---	---	>6.0	---	---	20-40	Soft	High-----	Low.
Beasley----------	C	None--------	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate.
Sx---------------- Skidmore	B	Occasional	Very brief	Dec-May	3.0-4.0	Apparent	Dec-Mar	>60	Hard	Low------	Moderate.
TsB, TsC---------- Tilsit	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	40-60	Hard	High-----	High.
TtB--------------- Trappist	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	High.
Ud*. Udorthents, smoothed											
WeB, WeC---------- Wheeling	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
WnD*:											
Wheeling---------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Nolin------------	B	Occasional	Brief-----	Feb-May	>6.0	---	---	>60	---	Low------	Moderate.
WoB--------------- Woolper	C	Rare--------	Brief-----	Dec-May	>6.0	---	---	>60	---	Moderate	Low.
WoC--------------- Woolper	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
W*. Water											

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 17.--Physical Analyses of Selected Soils

(Unless otherwise noted, the soils are the typical pedons for the soil series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology." Analyses were made by the Kentucky Agricultural Experiment Station)

Soil name, report number, horizon, and depth in inches	Total: Sand (2-0.05 mm)	Total: Silt (0.05-0.002 mm)	Total: Int. IV clay (<0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Textural class*
	Pct <2mm								
Ashton silt loam:									
(S90-KY-135-15)									
Ap----------0-10	29.2	53.0	17.8	0.2	0.2	0.2	5.9	22.7	sil
Bt1--------10-15	18.2	55.5	26.3	0.1	0.0	0.1	3.2	14.8	sil
Bt2--------15-28	12.4	53.7	33.9	0.1	0.1	0.1	1.4	10.7	sicl
Bt3--------28-40	21.5	48.3	30.2	0.0	0.1	0.0	3.1	18.3	sicl
Bt4--------40-51	34.8	41.5	23.7	0.0	0.0	0.1	5.9	28.8	l
Bt5--------51-62	27.5	50.2	22.3	0.0	0.1	0.1	4.0	23.3	sil
Caneyville silt loam**:									
(S94-KY-135-55)									
A-----------0-10	24.3	50.7	25.0	1.7	4.6	4.2	4.5	9.3	sil
Bt1---------3-10	15.1	40.9	44.0	0.5	0.6	0.8	2.1	11.1	sic
Bt2--------10-24	11.1	43.0	45.9	0.1	0.3	0.5	1.3	8.9	sic
Chavies fine sandy loam:									
(S90-KY-135-13)									
Ap----------0-8	64.8	22.3	12.9	0.2	0.6	6.6	40.0	17.4	fsl
Bt1---------8-22	65.6	17.6	16.8	0.1	0.4	6.2	42.3	16.6	fsl
Bt2--------22-49	60.5	22.1	17.4	0.1	0.2	1.9	38.5	19.8	fsl
Bt3--------49-54	68.0	18.2	13.8	0.0	0.1	2.9	43.6	21.4	fsl
C----------54-66	87.4	5.1	7.5	0.0	0.5	11.7	62.8	12.4	lfs
Covedale silt loam:									
(S94-KY-135-39									
Ap----------0-7	15.1	59.9	25.0	2.2	3.0	2.6	2.7	4.6	sil
B/A---------7-10	10.0	57.6	32.4	2.6	1.6	1.2	1.3	3.3	sicl
Bt1--------10-28	5.9	62.2	31.9	1.1	0.8	0.7	0.6	2.7	sicl
Bt2--------28-44	10.6	58.9	30.5	1.1	1.8	1.6	1.6	4.5	sicl
Bt3--------44-67	7.2	61.7	31.1	1.3	1.0	0.9	0.9	3.1	sicl
C----------67-71	12.2	45.6	42.2	3.5	2.5	2.0	1.6	2.6	sic
Hagerstown silt loam***:									
(S94-KY-135-21)									
Ap----------0-10	11.0	72.4	16.6	2.1	1.7	1.3	1.7	4.2	sil
Bt1--------10-18	18.4	51.5	30.1	10.3	2.8	1.3	1.0	3.0	sicl
Bt2--------18-38	7.5	51.5	41.0	3.0	1.2	0.5	0.3	2.5	sic
Bt3--------38-76	5.4	50.4	44.2	0.8	0.7	0.5	0.5	2.9	sic
Lakin loamy sand:									
(S90-KY-135-11)									
Ap----------0-12	88.6	5.1	6.3	0.1	4.6	51.6	24.8	7.5	ls
E&Bt1------12-21	95.1	3.0	1.9	0.0	3.0	62.5	28.0	1.6	s
E&Bt2------21-32	93.7	2.6	3.7	0.0	2.5	62.0	25.5	3.7	s
E&Bt3------32-54	97.1	0.8	2.1	0.0	4.1	68.1	24.4	0.5	s
E&Bt4------54-58	86.0	8.8	5.2	0.0	3.2	53.8	24.0	5.0	ls
E&Bt5------58-96	87.7	11.1	1.2	0.0	0.9	62.0	22.6	2.2	s

See footnotes at end of table.

Table 17.--Physical Analyses of Selected Soils--Continued

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter (mm)					
				Sand					
	Sand (2-0.05 mm)	Silt (0.05-0.002 mm)	Int. IV clay (<0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Textural class*
	---Pct <2mm---								
Melvin silt loam:									
(S90-KY-135-28)									
Ap----------0-7	22.9	58.9	18.2	2.0	4.0	2.9	2.9	11.1	sil
Bg----------7-21	19.4	59.4	21.2	0.4	1.2	2.2	2.8	12.8	sil
Cg1--------21-40	19.9	56.2	23.9	0.9	2.3	2.0	2.3	12.4	sil
Cg2--------40-70	22.5	53.3	24.2	1.5	2.4	2.6	2.3	13.7	sil
Wheeling loam:									
(S90-KY-135-12)									
Ap----------0-9	50.7	31.9	17.4	1.0	9.2	0.0	25.6	14.9	l
Bt1---------9-20	45.1	30.0	24.9	0.2	0.5	6.1	24.3	14.0	l
Bt2--------20-27	61.1	17.6	21.3	0.0	0.5	10.7	33.2	16.7	scl
Bt3--------27-32	70.9	12.4	16.7	0.2	0.5	18.1	42.7	9.4	fsl
BC---------32-44	69.7	18.5	11.8	0.1	0.4	14.0	43.3	11.9	fsl
2Bt4-------44-56	61.1	24.5	14.4	0.0	0.3	5.7	32.0	23.1	fsl
2BC--------56-58	83.5	11.3	5.2	0.2	0.6	23.0	47.3	12.4	lfs
3Bt5-------58-64	71.1	12.6	16.3	0.0	0.3	11.6	43.5	15.7	fsl
3BC--------64-69	80.4	8.5	11.1	0.1	0.7	22.0	47.0	10.6	fsl
Woolper silty clay loam:									
(S90-KY-135-19)									
Ap----------0-10	14.7	54.1	31.2	1.3	2.0	2.7	4.0	4.7	sicl
Bt1--------10-14	8.6	57.0	34.4	0.6	0.7	1.2	2.1	4.0	sicl
Bt2--------14-23	6.2	54.3	39.5	0.4	0.3	0.8	1.5	3.2	sicl
Bt3--------23-35	7.5	51.1	41.4	0.2	0.6	1.1	2.0	3.6	sic
BC---------35-45	19.9	33.9	46.2	3.2	4.2	4.1	4.7	3.7	c

* The letter c means clay; fsl, fine sandy loam; l, loam; lfs, loamy fine sand; ls, loamy sand; s, sand; scl, sandy clay loam; sic, silty clay; sicl, silty clay loam; and sil, silt loam.

** This is not the typical pedon. The location of this site is 0.7 mile south of Carr, 400 feet north of a power line, and 80 feet west of a gravel road; soil atlas sheet 8; Concord-Buena Vista Quadrangle.

*** This is not the typical pedon. The location of this site is 0.5 mile south-southeast of Ribolt, 1,720 feet northeast of Bethel Church, and 320 feet southeast of a barn, in a hayfield; soil atlas sheet 19; Tollesboro Quadrangle.

Table 18.--Chemical Analyses of Selected Soils

(The soil is the typical pedon for the soil series in the survey area. For the location of the pedon, see "Soil Series and Their Morphology." Analyses were made by the Kentucky Agricultural Experiment Station)

Soil name, report number, horizon, and depth in inches	Extractable cations					Cation-exchange capacity		Extractable acidity	Base saturation	
	Ca	Mg	K	Na	Total (TEC)	Ammonium acetate	Sum of cations		Ammonium acetate	Sum of cations
	---------Milliequivalents per 100 grams of soil---------								Pct	Pct
Woolper silty clay loam:										
(S90-KY-135-19)										
Ap-----------0 to 10	18.01	0.89	0.95	0.02	19.87	14.61	24.42	4.55	136	81
Bt1---------10 to 14	17.49	0.78	0.77	0.02	19.06	14.66	23.39	4.33	130	81
Bt2---------14 to 23	13.69	0.68	0.60	0.04	15.01	14.15	20.06	5.05	106	75
Bt3---------23 to 35	13.68	0.79	0.63	0.12	14.92	16.79	20.83	5.91	89	72
BC----------35 to 45	22.50	1.04	0.67	0.04	24.25	15.71	28.15	3.90	154	86

Table 19.--Mineralogical Analyses of Selected Soils

(A blank indicates the determination was not made. Unless otherwise noted, the soils are the typical pedons for the soil series in the survey area. For the location of the pedons, see "Soil Series and Their Morphology." Analyses were made by the Kentucky Agricultural Experiment Station)

Soil name, report number horizon, and depth in inches	Estimated percentage in various fractions of the clay*												
	SM	V	HIV	CL	INT	K	MI	Q	GI	GO	LE	F	Class
Caneyville**:													
(S94-KY-135-55)													
Bt1------3 to 10		17			18	38	23	4					
Bt2-----10 to 24		21			22	28	24	4				1	mixed
Covedale:													
(S90-KY-135-13)													
Bt1-----10 to 20		11			17	23	41	7				1	mixed
Bt2-----20 to 28		18			16	22	35	8				1	mixed
Hagerstown***:													
(S94-KY-135-21)													
Bt1-----10 to 18		42			11	28	8	6		3		2	mixed
Bt2-----18 to 38		45			5	31	8	5		4		2	mixed
Shrouts:													
(S92-KY-135-2)													
Bt-------3 to 20		10			50	5	30				5		mixed

* Abbreviations for the minerals are as follows: SM = smectite; V = vermiculite; HIV = hydroxinterlayered vermiculite; CL = chlorite; INT = interstratified; K = kaolinite; MI = mica; Q = quartz; GO = geothite; GI = gibbsite; LE = lepidocrocite; and F = feldspars.

** This is not the typical pedon. The location of this site is 0.7 mile south of Carr, 400 feet north of a power line, and 80 feet west of a gravel road; soil atlas sheet 8; Concord-Buena Vista Quadrangle.

*** This is not the typical pedon. The location of this site is 0.5 mile south-southeast of Ribolt, 1,720 feet northeast of Bethel Church, and 320 feet southeast of a barn, in a hayfield; soil atlas sheet 19; Tollesboro Quadrangle.

Table 20.--Classification of the Soils

Soil name	Family or higher taxonomic class
Aaron	Fine, mixed, mesic Oxyaquic Hapludalfs
Ashton	Fine-silty, mixed, mesic Mollic Hapludalfs
Beasley	Fine, mixed, mesic Typic Hapludalfs
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Blairton	Fine-loamy, mixed, mesic Aquic Hapludults
Boonesboro	Fine-loamy, mixed, mesic Fluventic Hapludolls
Brownsville	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Caneyville	Fine, mixed, mesic Typic Hapludalfs
Chavies	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Colyer	Clayey-skeletal, mixed, mesic Lithic Dystrochrepts
Covedale	Fine-silty, mixed, mesic Typic Paleudults
Crider	Fine-silty, mixed, mesic Typic Paleudalfs
Elk	Fine-silty, mixed, mesic Ultic Hapludalfs
Fairmount	Clayey, mixed, mesic Lithic Hapludolls
Faywood	Fine, mixed, mesic Typic Hapludalfs
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Hagerstown	Fine, mixed, mesic Typic Hapludalfs
Haymond	Coarse-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Kinnick	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Lakin	Mixed, mesic Argic Udipsamments
Lawrence	Fine-silty, mixed, mesic Aquic Fragiudalfs
McGary	Fine, mixed, mesic Aeric Epiaqualfs
Melvin	Fine-silty, mixed, mesic Typic Fluvaquents
Morehead	Fine-silty, mixed, mesic Aquic Hapludults
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nicholson	Fine-silty, mixed, mesic Oxyaquic Fragiudalfs
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Otwell	Fine-silty, mixed, mesic Oxyaquic Fragiudalfs
Sees	Fine, mixed, mesic Aquollic Hapludalfs
Shelocta	Fine-loamy, mixed, mesic Typic Hapludults
Shrouts	Fine, mixed, mesic Typic Hapludalfs
Skidmore	Loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts
Tilsit	Fine-silty, mixed, mesic Typic Fragiudults
Trappist	Clayey, mixed, mesic Typic Hapludults
Wheeling	Fine-loamy, mixed, mesic Ultic Hapludalfs
Woolper	Fine, mixed, mesic Typic Argiudolls

Table 21.--Geologic Systems, Formations, and Members

System	Formation	Member or bed	Description of material	Associated soils
Quaternary	Local alluvium	From local streams within the county	Mixed sands, silt, and clay gravel	Boonesboro, Elk, Haymond, Kinnick, McGary, Melvin, Morehead, Newark, Nolin, Otwell, Sees, Skidmore, Woolper
	Nonlocal alluvium	From outside the county, namely, the Ohio River valley watershed	Mixed sand, silt, and clay	Ashton, Lawrence, Melvin Morehead, Newark, Nolin, Otwell, Wheeling
		Eolian sands	Wind-transported sand and silt	Chavies, Lakin
		Glacial outwash	Well sorted sand, gravel, and silt	Chavies, Otwell, Wheeling
		Lake sediments	Silt and clay, commonly calcareous	Elk, Wheeling
Pennsylvanian	Breathitt	Olive Hill Clay Bed of Crider	Plastic, semiflint and flint clay	Gilpin, Tilsit
	Breathitt and Lee	Bruin Coal Bed	Coal bed up to 6 inches thick	Pits, quarries
		Sandstone bed	Sandstone	Gilpin, Tilsit
	Lee	Olive Hill Clay Bed of Crider	Plastic, semiflint and flint clay	Gilpin, Tilsit
		Sandstone bed	Sandstone, chert rubble, and shale	Gilpin, Tilsit
Mississippian	Carter Caves Sandstone	---	Sandstone (white to light gray)	Gilpin
	Newman Limestone	---	Limestone	Caneyville
	Borden	Nada Shale	Shale, siltstone, and limestone, mostly shale	Gilpin
		Cowbell Siltstone	Siltstone and shale	Berks, Brownsville, Shelocta
		Nancy Shale	Shale, siltstone, and sandstone, mostly shale	Blairton, Tilsit
		Farmers Sandstone	Sandstone and shale, mostly sandstone	Berks, Brownsville, Shelocta

Table 21.--Geologic Systems, Formations, and Members--Continued

System	Formation	Member or bed	Description of material	Associated soils
Mississippian (continued)	Sunbury Shale	---	Dark gray to black, thinly bedded, carbonaceous, fissile shale	Colyer, Covedale, Trappist
	Berea Sandstone	---	Sandstone	Berks, Brownsville, Shelocta
	Bedford Shale	---	Shale and siltstone	Blairton, Tilsit
Devonian	Ohio Shale	---	Dark gray to black, thinly bedded, carbonaceous, fissile shale	Colyer, Covedale, Trappist
Silurian	Bisher Limestone	---	Fine grained to coarse grained dolomite and dolomitic limestone	Beasley, Caneyville, Hagerstown, Crider, Nicholson
	Upper Crab Orchard	---	Clay shale, greenish gray and gray, glauconite near base (highly calcareous)	Aaron, Lawrence, McGary, Nicholson, Shrouts
	Lower Crab Orchard	---	Dolomite and dolomitic limestone with interbedded clay shale	Beasley, Shrouts, Crider, Nicholson
Ordovician	Drakes	Preachersville	Thinly bedded shales and calcareous, coarse grained dolomite	Beasley
	Bull Fork	---	Interbedded shale and limestone (20 to 80 percent)	Fairmount, Faywood, Woolper
	Grant Lake	Upper	Interbedded limestone (up to 85 percent) and thin clay shale	Fairmount, Faywood, Woolper
		Lower	Thinly bedded limestone at base of Cabin Creek	---

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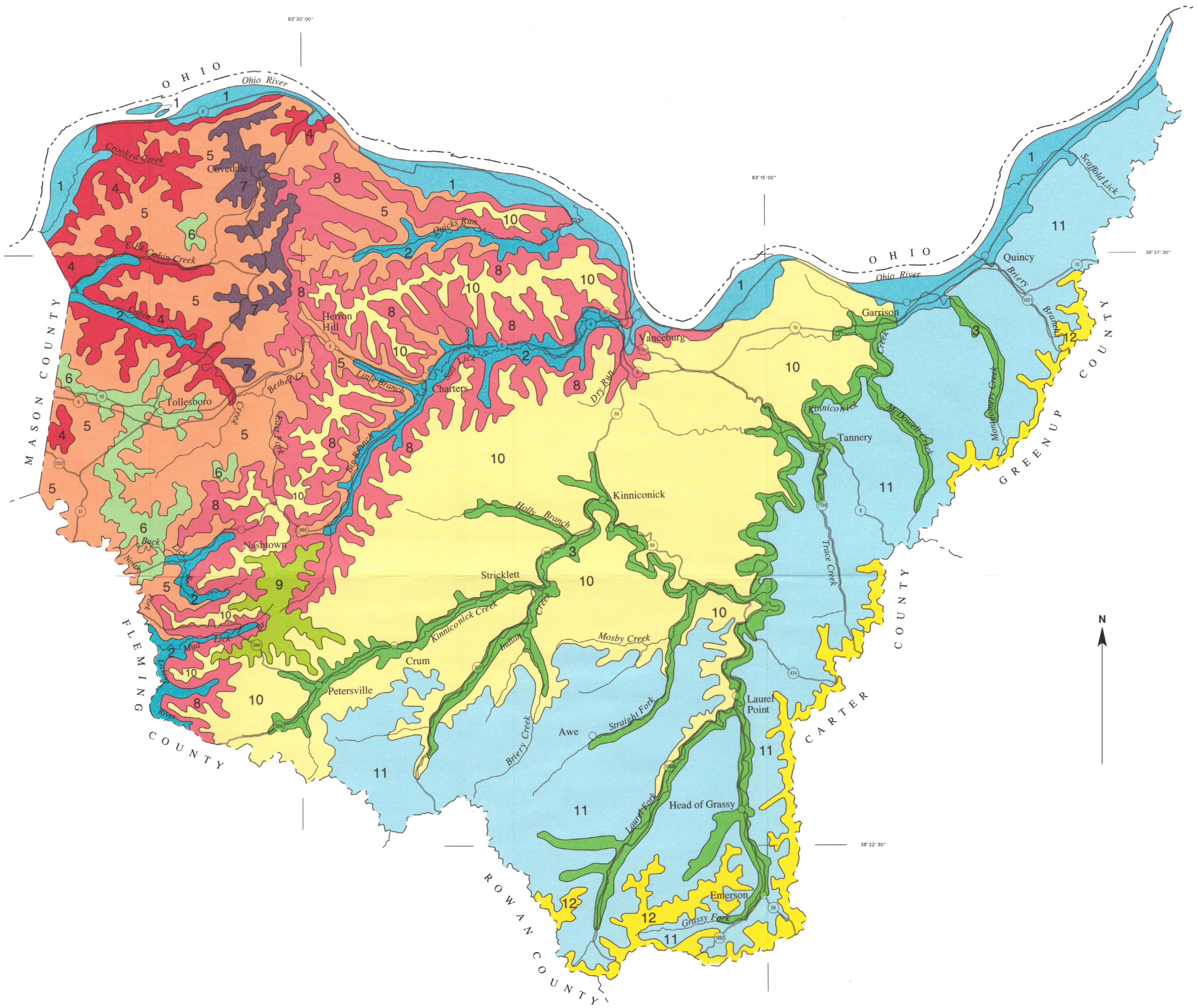


SOIL LEGEND*

1	Wheeling-Nolin-Otwell
2	Newark-Kinnick-Skidmore
3	Skidmore-Shelocta-Haymond
4	Fairmount-Faywood
5	Shrouts-Beasley
6	Lawrence-Nicholson-McGary
7	Hagerstown-Caneyville-Beasley
8	Covedale-Trappist
9	Blairton-Berks-Brownsville
10	Berks-Brownsville-Blairton
11	Berks-Brownsville-Shelocta
12	Gilpin-Caneyville

*The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1998

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
KENTUCKY NATURAL RESOURCES
AND ENVIRONMENTAL PROTECTION CABINET
KENTUCKY AGRICULTURAL EXPERIMENT STATION

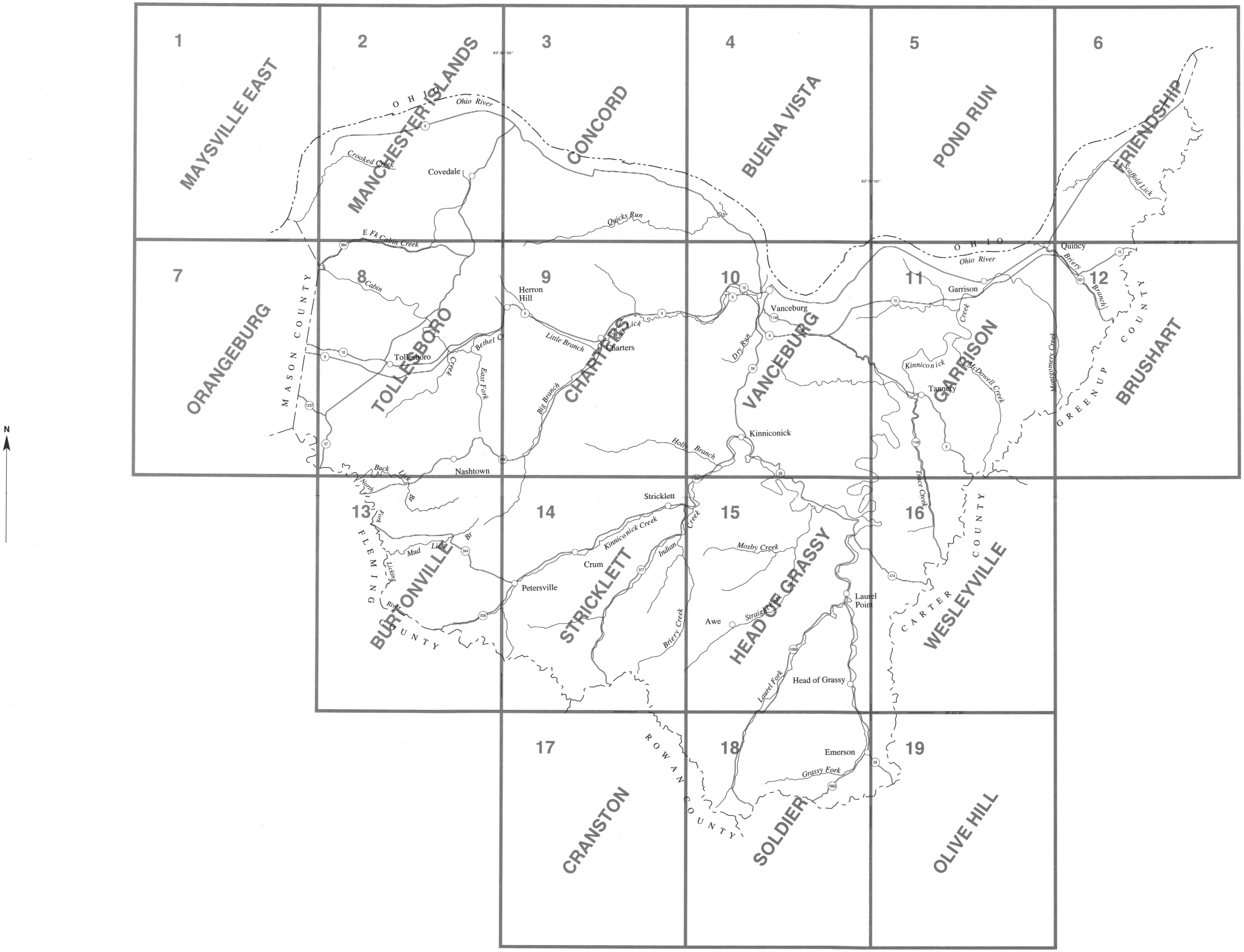
GENERAL SOIL MAP
LEWIS COUNTY, KENTUCKY

Scale 1:126720

MILES

KILOMETERS

Each area outlined on this map consists of more than one kind of soil. The map is meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS
LEWIS COUNTY, KENTUCKY

Scale 1:126720

MILES

KILOMETERS

SOIL LEGEND

SYMBOL	NAME
AaB	Aaron silt loam, 2 to 6 percent slopes
AsB	Ashton silt loam, 2 to 6 percent slopes
BaB	Beasley silt loam, 2 to 6 percent slopes
BeC2	Beasley silt loam, 6 to 12 percent slopes, rocky, eroded
BhE2	Beasley-Shrouts complex, 12 to 30 percent slopes, very rocky, eroded
BnF2	Berks-Brownsville complex, 30 to 55 percent slopes, very rocky, eroded
BoF2	Berks-Brownsville-Shelocta complex, 30 to 65 percent slopes, eroded
BrB	Blairton silt loam, 2 to 6 percent slopes
BrC2	Blairton silt loam, 6 to 12 percent slopes, eroded
BrE2	Blairton silt loam, 12 to 30 percent slopes, eroded
Bs	Boonesboro silt loam, frequently flooded
BvF2	Brownsville-Berks complex, 30 to 60 percent slopes, eroded
CaE2	Caneyville-Hagerstown-Rock outcrop complex, 12 to 45 percent slopes, eroded
CeE2	Caneyville-Rock outcrop complex, 12 to 30 percent slopes, eroded
ChB	Chavies fine sandy loam, 2 to 6 percent slopes
ChC	Chavies fine sandy loam, 6 to 12 percent slopes
CkF2	Colyer-Trappist silt loams, 12 to 60 percent slopes, eroded
CoB	Covedale silt loam, 2 to 6 percent slopes
CoC2	Covedale silt loam, 6 to 12 percent slopes, eroded
CsD2	Covedale-Shrouts complex, 12 to 25 percent slopes, eroded
CtD2	Covedale-Trappist silt loams, 12 to 20 percent slopes, eroded
CtF2	Covedale-Trappist silt loams, 20 to 55 percent slopes, eroded
CxB	Crider silt loam, 2 to 6 percent slopes
EkB	Elk silt loam, 2 to 8 percent slopes
FaF2	Fairmount-Faywood complex, 20 to 55 percent slopes, very rocky, eroded
GnD2	Gilpin silt loam, 6 to 20 percent slopes, eroded
GnE2	Gilpin silt loam, 20 to 45 percent slopes, eroded
HgB	Hagerstown silt loam, 2 to 6 percent slopes
HgC	Hagerstown silt loam, 6 to 12 percent slopes
Hn	Haymond silt loam, frequently flooded
Kn	Kinnick silt loam, occasionally flooded
LkB	Lakin loamy sand, 2 to 8 percent slopes
LkC	Lakin loamy sand, 8 to 15 percent slopes
LkE	Lakin loamy sand, 15 to 35 percent slopes
Lw	Lawrence silt loam
Mc	McGary silt loam
Me	Melvin silt loam, frequently flooded
Mo	Morehead silt loam, rarely flooded
Ne	Newark silt loam, occasionally flooded
NhB	Nicholson silt loam, 2 to 6 percent slopes
NhC	Nicholson silt loam, 6 to 12 percent slopes
No	Nolin silt loam, occasionally flooded
OtB	Otwell silt loam, 2 to 6 percent slopes
OtC	Otwell silt loam, 6 to 12 percent slopes
Pt	Pits, quarries
Se	Sees silt loam, 2 to 4 percent slopes, occasionally flooded
ShC	Shelocta gravelly silt loam, 6 to 12 percent slopes
ShD	Shelocta gravelly silt loam, 12 to 20 percent slopes
SkF2	Shelocta silt loam, 20 to 45 percent slopes, eroded
SmB	Shelocta-Skidmore complex, 2 to 6 percent slopes
SrB	Shrouts silty clay loam, 2 to 6 percent slopes
SrD3	Shrouts silty clay loam, 12 to 30 percent slopes, severely eroded
SsC2	Shrouts-Beasley complex, 6 to 12 percent slopes, eroded
Sx	Skidmore gravelly silt loam, occasionally flooded
TsB	Tilsit silt loam, 2 to 6 percent slopes
Tsc	Tilsit silt loam, 6 to 12 percent slopes
TtB	Trappist silt loam, 2 to 6 percent slopes
Ud	Udorthents, smoothed
WeB	Wheeling loam, 2 to 6 percent slopes
WeC	Wheeling loam, 6 to 12 percent slopes
Wnd	Wheeling-Nolin complex, 2 to 30 percent slopes
WoB	Woolper silty clay loam, 2 to 6 percent slopes, rarely flooded
WoC	Woolper silty clay loam, 6 to 12 percent slopes
W	Water (>40ac)
W	Water (<40ac)

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park)
- Land grant
- Limit of soil survey (lable) and/or denied access area
- Field sheet matchline & neatline
- Previously Published Survey

OTHER BOUNDARY (label)

- Airport, airfield
- Cemetery
- City/county park

STATE COORDINATE TICK 1 890 000 FEET

LAND DIVISION CORNER (section and land grants)

GEOGRAPHIC COORDINATE TICK

TRANSPORTATION

- Divided roads
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate (173, 79, 345)
- Federal (287, 410, 224)
- State (52, 52, 347)
- County, farm or ranch (1283)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad
- Single side slope (showing actual feature location)

DAMS

- Medium or Small

LANDFORM FEATURES

- Prominent hill or peak
- Soil Sample Site

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Other Religion (label) (Mt Carmel)
- Located object (label) (Ranger Station)
- Tank (label) (Petroleum)
- Lookout Tower
- Oil and/or Natural Gas Wells
- Windmill
- Lighthouse

HYDROGRAPHIC FEATURES

STREAMS

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

DRAINAGE AND IRRIGATION

- Double-line canal (label) (CANAL)
- Perennial drainage and/or irrigation ditch
- Intermittent drainage and/ or irrigation ditch

SMALL LAKES, PONDS AND RESERVOIRS

- Perennial water
- Miscellaneous water
- Flood pool line (FLOOD POOL LINE)

MISCELLANEOUS WATER FEATURES

- Spring
- Well, artesian
- Well, irrigation

SPECIAL SYMBOLS FOR SOIL SURVEY AND SSURGO

SOIL DELINEATIONS AND SYMBOLS (BaB CoB)

LANDFORM FEATURES

- ESCARPMENTS
  - Bedrock
  - Other than bedrock
- SHORT STEEP SLOPE
- GULLY
- DEPRESSION, closed
- SINKHOLE

EXCAVATIONS

- PITS
  - Borrow pits
  - Gravel pit
  - Mine or quarry
- LANDFILL

MISCELLANEOUS SURFACE FEATURES

- Blowout
- Clay spot
- Gravelly spot
- Lava flow
- Marsh or swamp
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip
- Sodic spot
- Spoil area
- Stony spot
- Very stony spot
- Wet spot

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
MAYSVILLE EAST QUADRANGLE
SHEET NUMBER 1 OF 19

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Dept. of Interior, Geological Survey, from 1993 aerial photography. Hydrography information was acquired from the Natural Resources Conservation Service.

North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

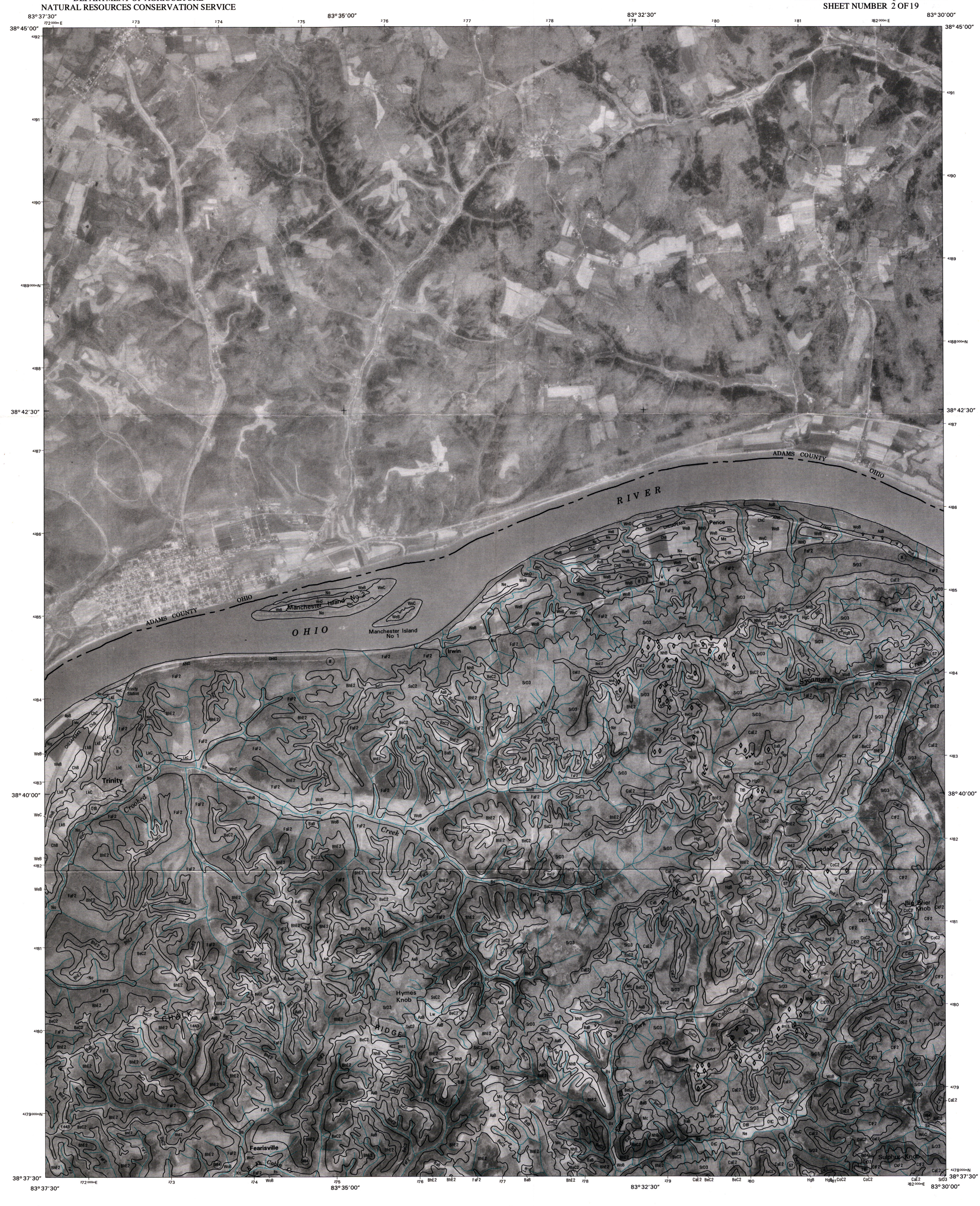
LEWIS COUNTY, KENTUCKY NO. 1

1	2	3	1 RUSSELLVILLE
			2 DECATUR
			3 WEST UNION
4		5	4 MAYSVILLE WEST
			5 MANCHESTER ISLANDS
			6 MAYS LICK
6	7	8	7 ORANGEBURG
			8 TOLLESBORO

INDEX TO ADJOINING 7.5 MAPS

MAYSVILLE EAST, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 1 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
MILES

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
KILOMETERS

1	2	3
4		5
6	7	8

1 DECATUR
2 WEST UNION
3 LYNX
4 MAYSVILLE EAST
5 CONCORD
6 ORANGEBURG
7 TOLLESBORO
8 CHARTERS

INDEX TO ADJOINING 7.5 MAPS

MANCHESTER ISLANDS, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 2 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
CONCORD QUADRANGLE
SHEET NUMBER 3 OF 19

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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 WEST UNION
2 LYNX
3 BLUE CREEK
4 MANCHESTER ISLANDS
5 BUENA VISTA
6 TOLLESBORO
7 CHARTERS
8 VANCEBURG

INDEX TO ADJOINING 7.5 MAPS

CONCORD, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 3 OF 19

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Dept. of Interior, Geological Survey, from 1993 aerial photography. Hydrography information was acquired from the Natural Resources Conservation Service.

North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

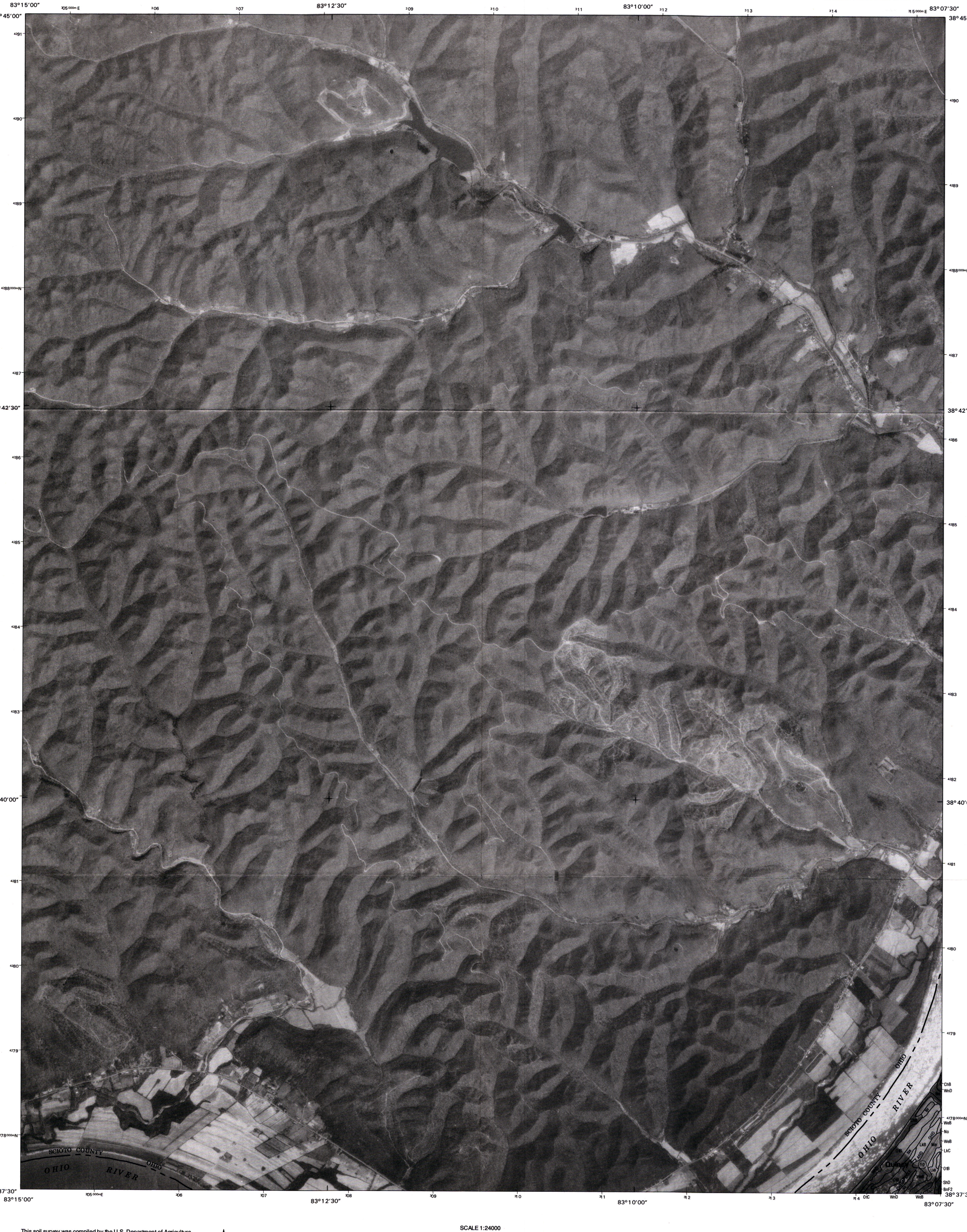
1 LYNX
2 BLUE CREEK
3 OTWAY
4 CONCORD
5 POND RUN
6 CHARTERS
7 VANCEBURG
8 GARRISON

INDEX TO ADJOINING 7.5 MAPS

BUENA VISTA, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 4 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
POND RUN QUADRANGLE
SHEET NUMBER 5 OF 19



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
MILES

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
KILOMETERS

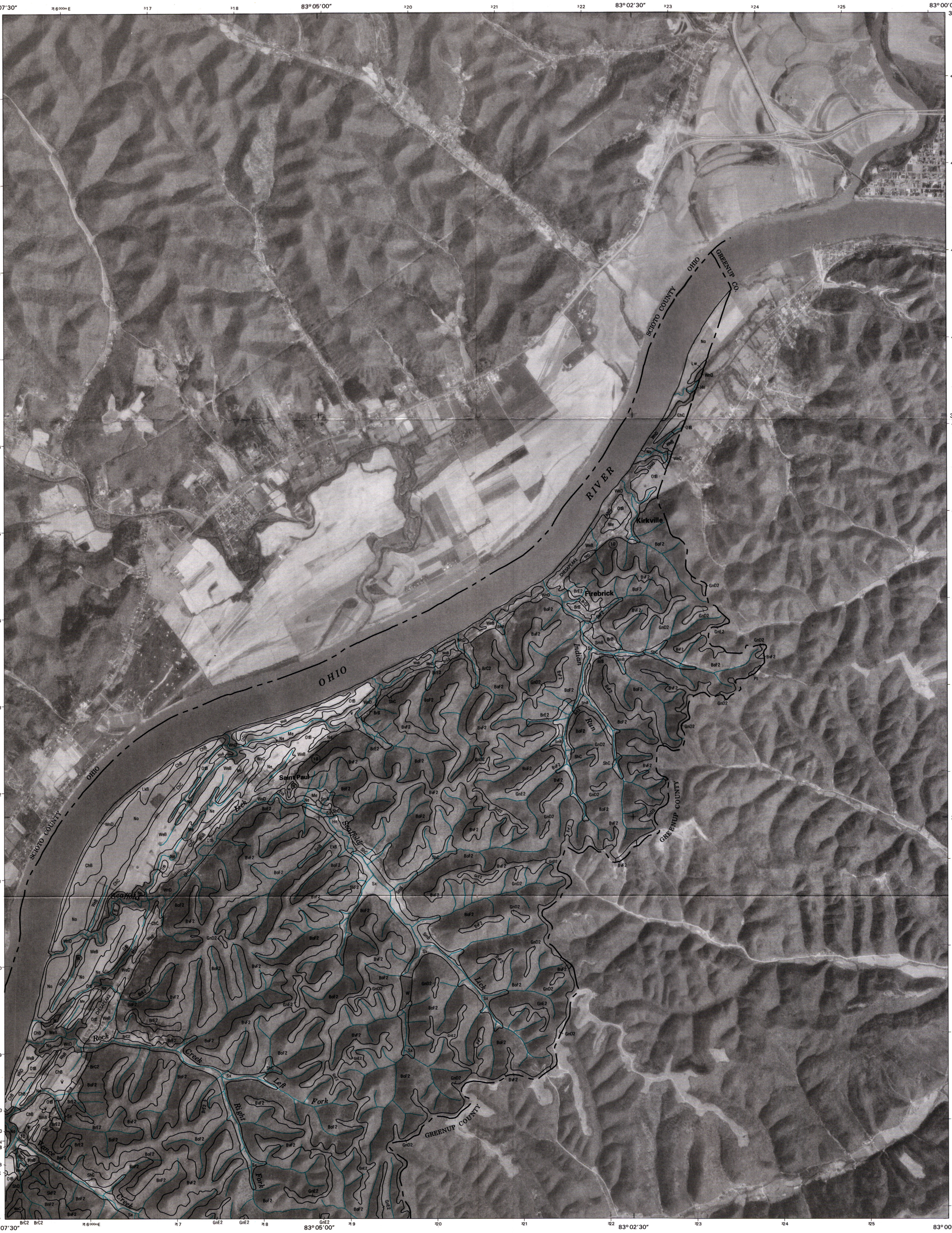
1	2	3
4		5
6	7	8

1 BLUE CREEK
2 OTWAY
3 WEST PORTSMUTH
4 BUENA VISTA
5 FRIENDSHIP
6 VANCEBURG
7 GARRISON
8 BRUSHART

INDEX TO ADJOINING 7.5 MAPS

POND RUN, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 5 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
MILES

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
KILOMETERS

1	2	3
4		5
6	7	8

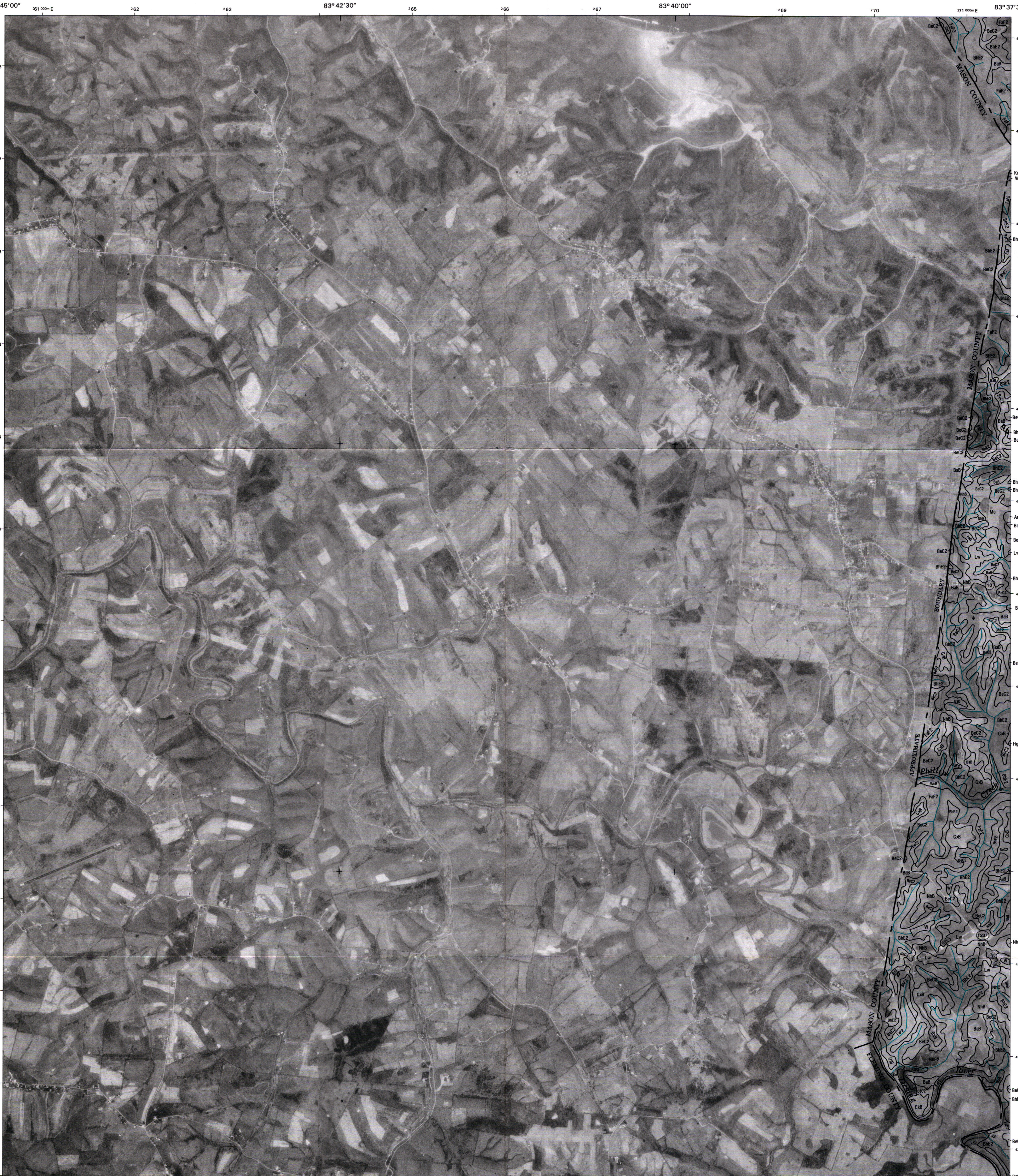
1 OTWAY
2 WEST PORTSMOUTH
3 NEW BOSTON
4 POND RUN
5 PORTSMOUTH
6 GARRISON
7 BRUSHART
8 LOAD

INDEX TO ADJOINING 7.5 MAPS

FRIENDSHIP, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 6 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
ORANGEBURG QUADRANGLE
SHEET NUMBER 7 OF 19



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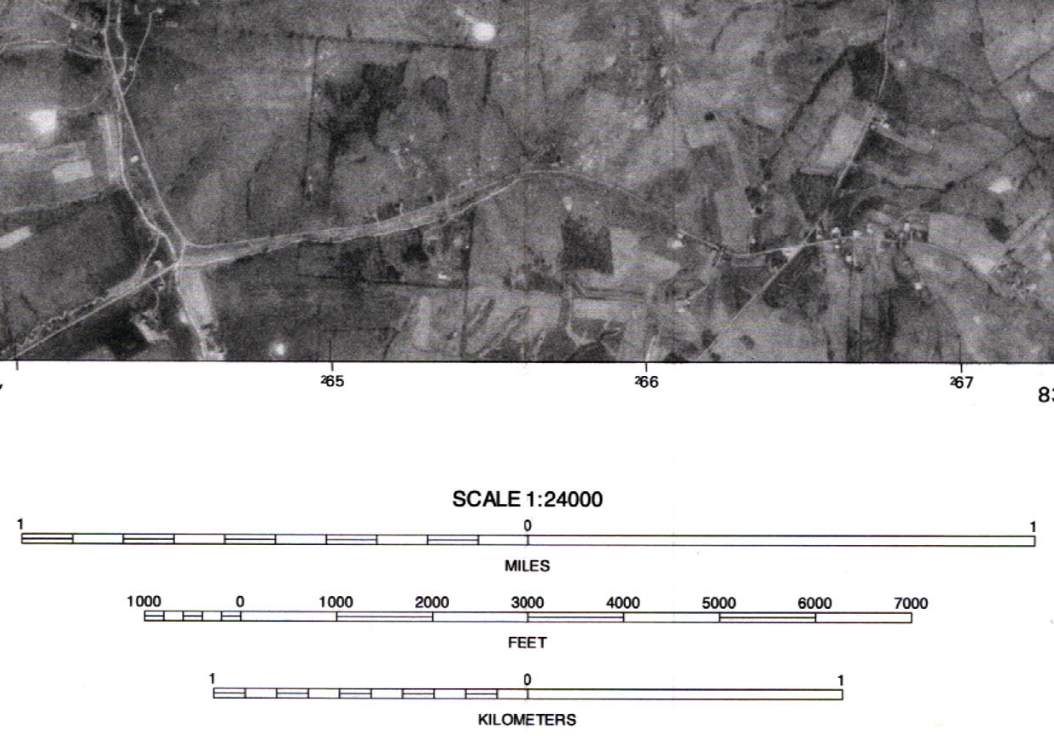
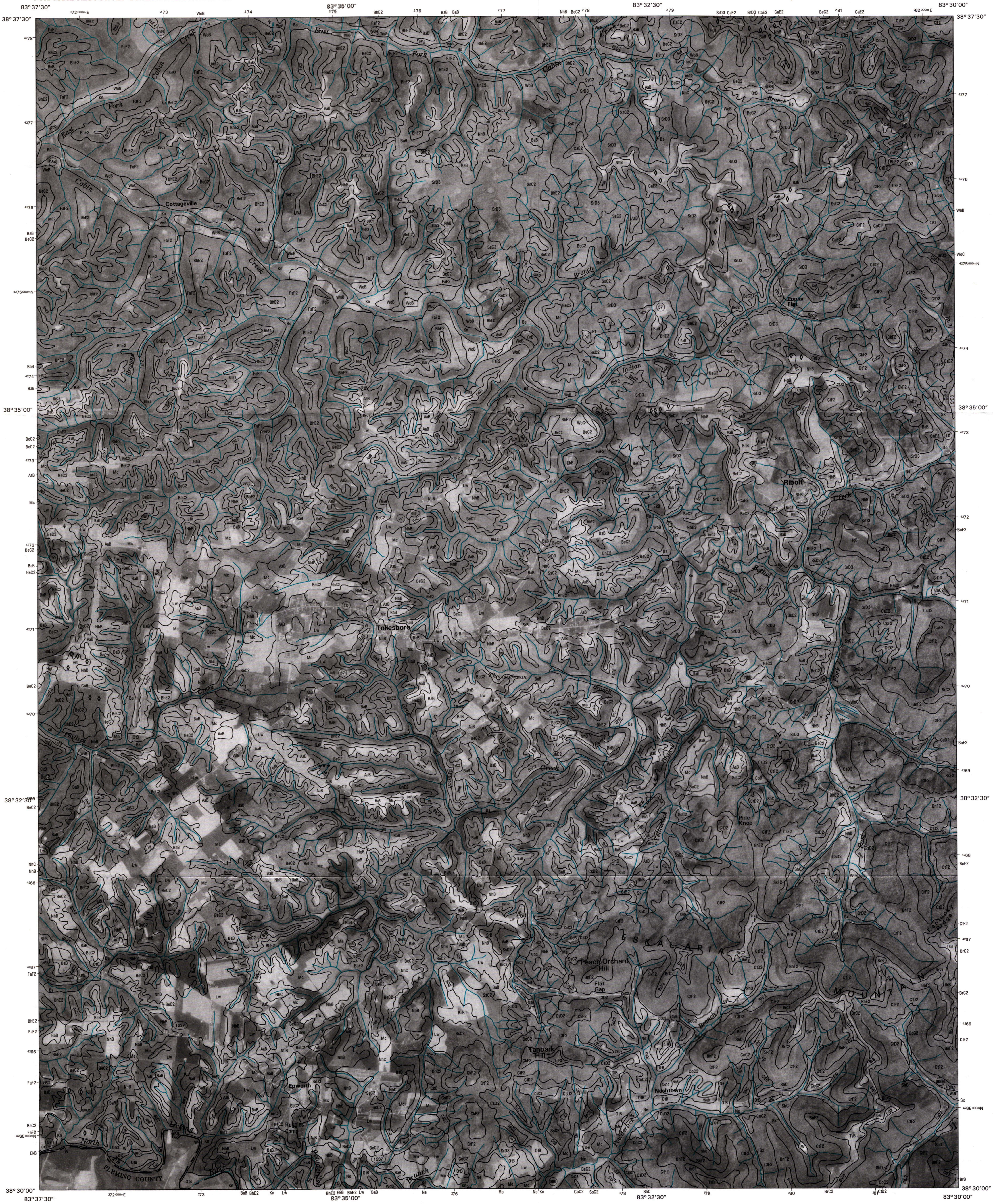
North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



ORANGEBURG, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 7 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
TOLLESBORO QUADRANGLE
SHEET NUMBER 8 OF 19



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

1 MAYSVILLE EAST
2 MANCHESTER ISLANDS
3 CONCORD
4 ORANGEBURG
5 CHARTERS
6 FLEMINGSBURG
7 BURTONVILLE
8 STRICKLETT

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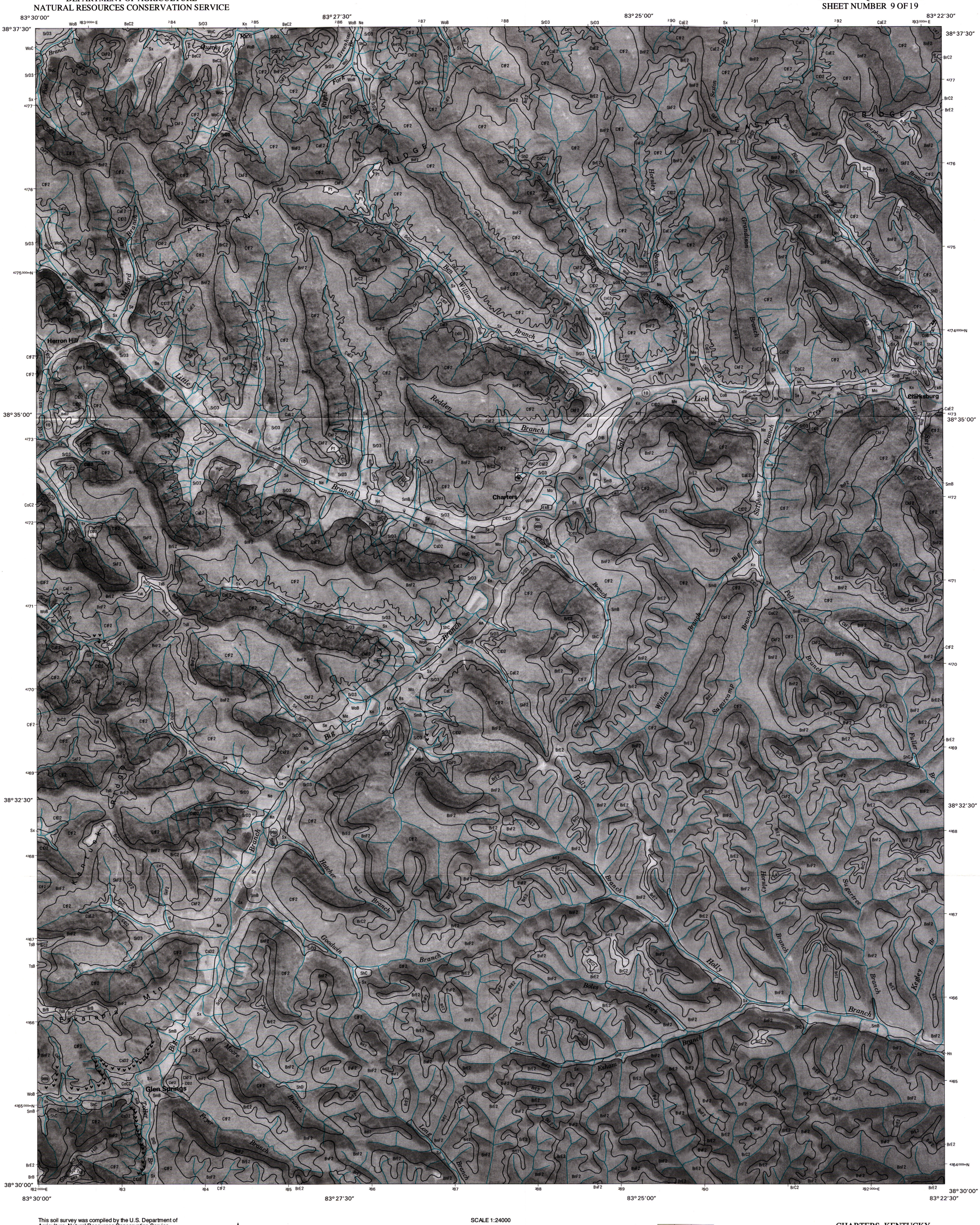
TOLLESBORO, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 8 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
CHARTERS QUADRANGLE
SHEET NUMBER 9 OF 19



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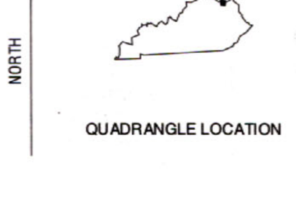
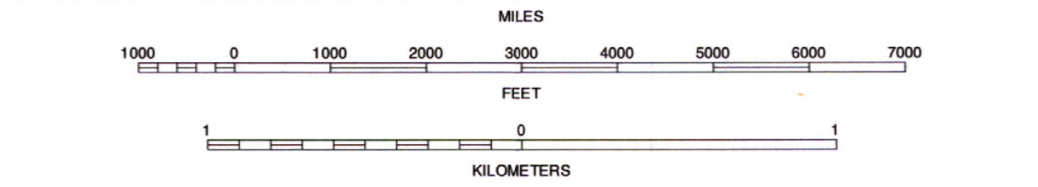
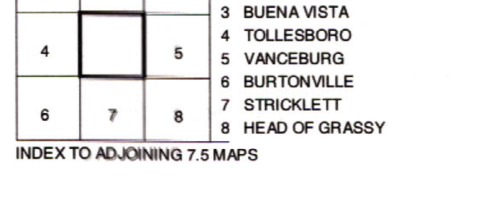
North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



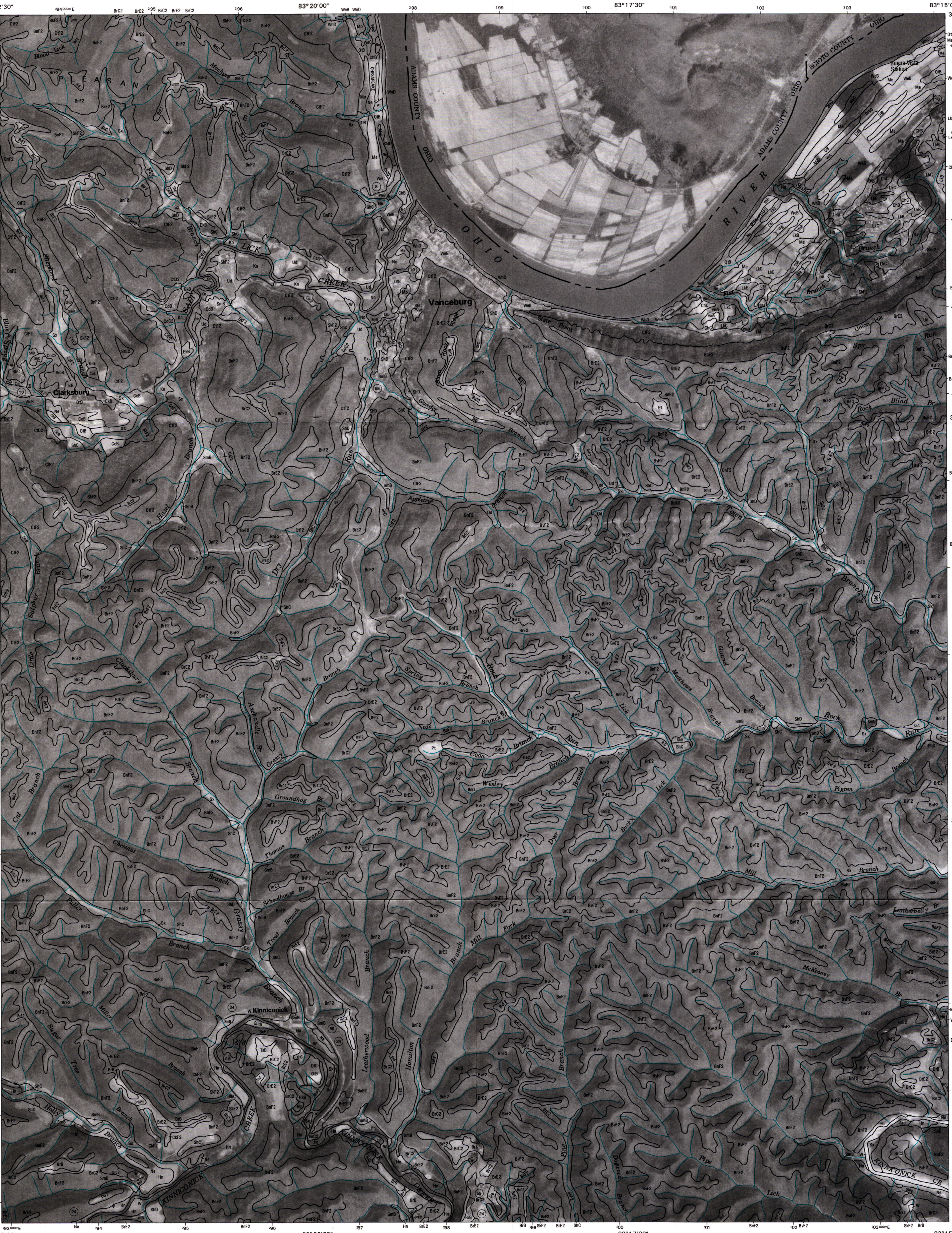




CHARTERS, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 9 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
VANCEBURG QUADRANGLE
SHEET NUMBER 10 OF 19



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

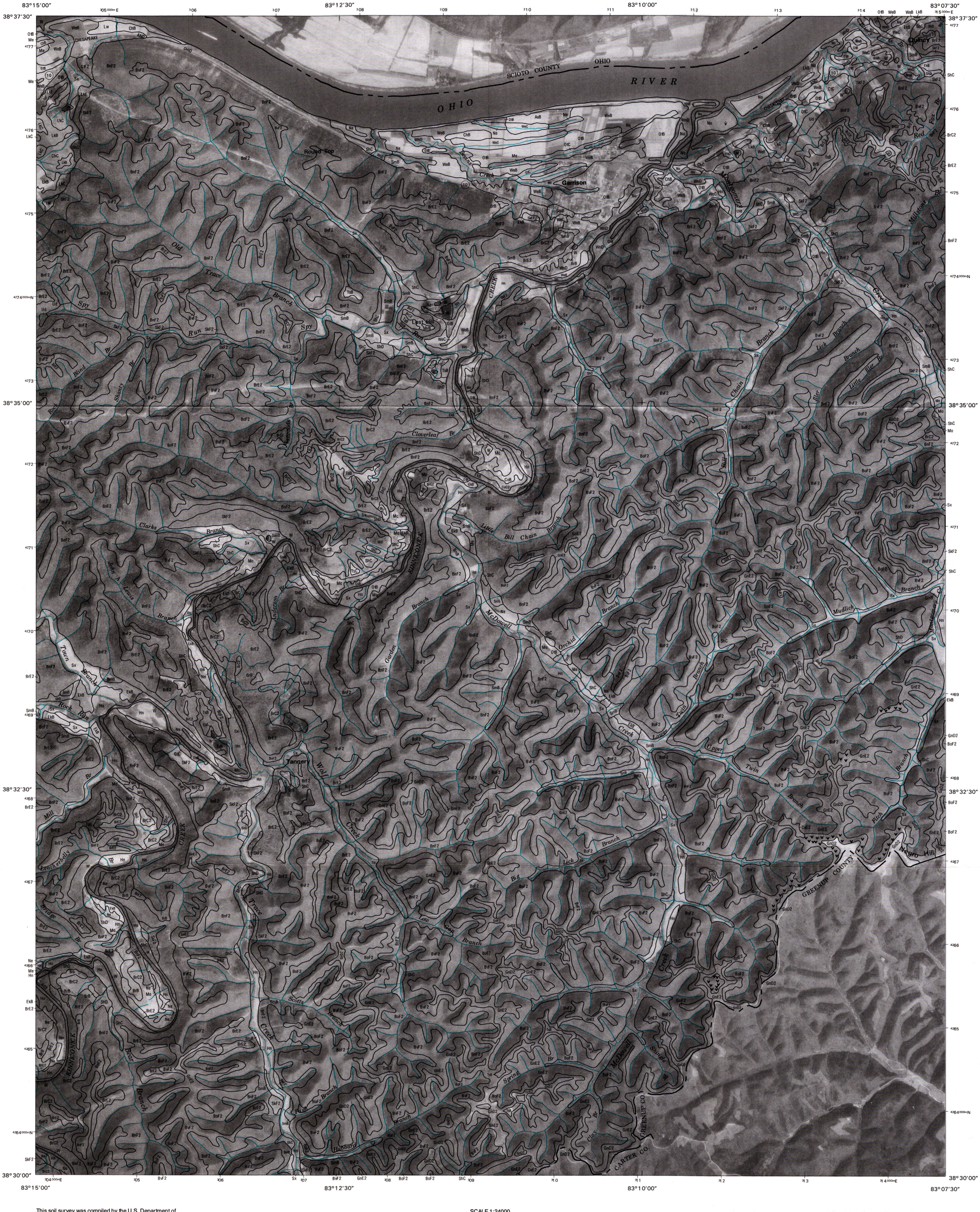
KILOMETERS

1	2	3	
4		5	
6	7	8	

1 CONCORD
2 BUENA VISTA
3 POND RUN
4 CHARTERS
5 GARRISON
6 STRICKLETT
7 HEAD OF GRASSY
8 WESLEYVILLE

INDEX TO ADJOINING 7.5 MAPS

VANCEBURG, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 10 OF 19



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1 MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETERS

1	2	3
4		5
6	7	8

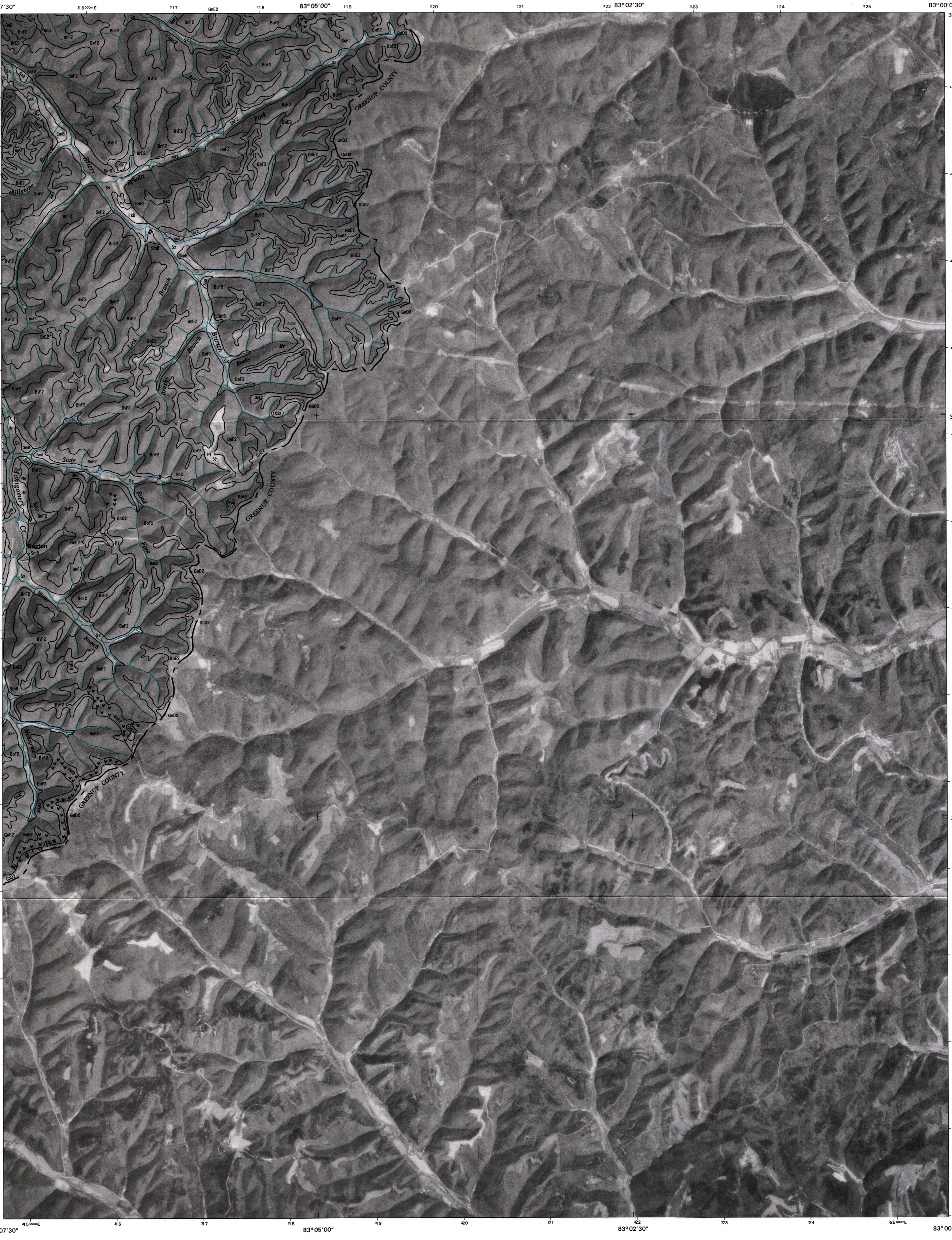
1 BUENA VISTA
2 POND RUN
3 FRIENDSHIP
4 VANCEBURG
5 BRUSHART
6 HEAD OF GRASSY
7 WESLEYVILLE
8 TYGARTS VALLEY

INDEX TO ADJOINING 7.5 MAPS

GARRISON, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 11 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
BRUSHART QUADRANGLE
SHEET NUMBER 12 OF 19



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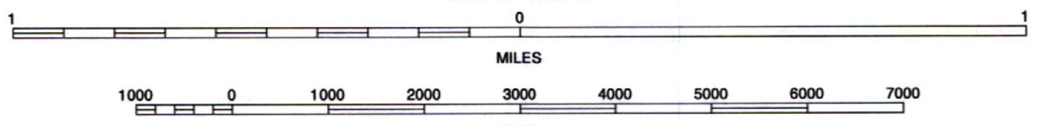
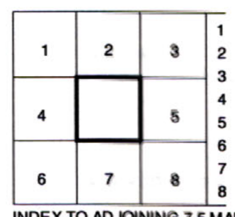
North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

QUADRANGLE LOCATION

SCALE 1:24000





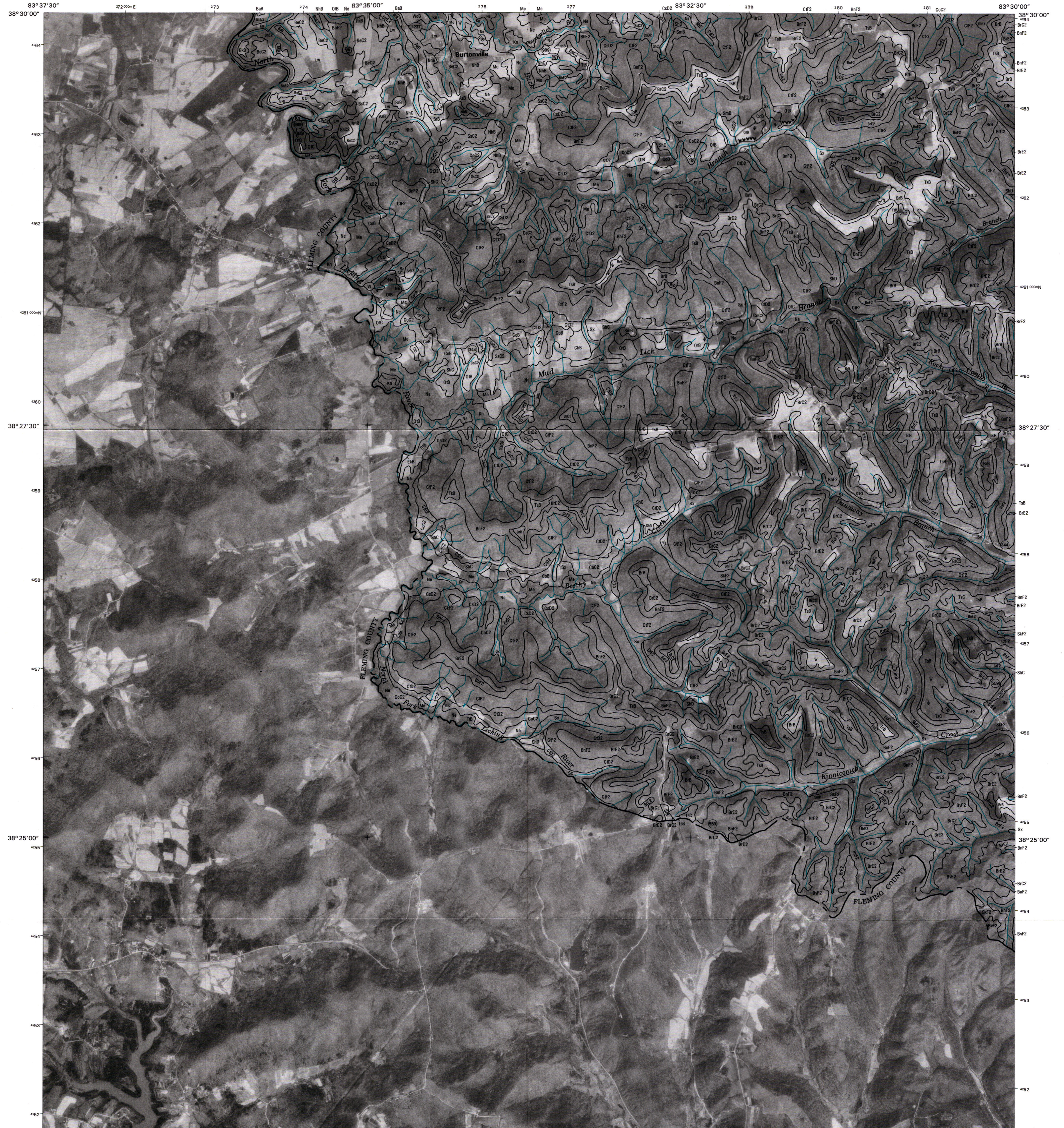
1 POND RUN
2 FRIENDSHIP
3 PORTSMOUTH
4 GARRISON
5 LOAD
6 WESLEYVILLE
7 TYGARTS VALLEY
8 OLDTOWN

INDEX TO ADJOINING 7.5 MAPS

BRUSHART, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 12 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
BURTONVILLE QUADRANGLE
SHEET NUMBER 13 OF 19



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 17.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1 MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETERS

1	2	3
4		5
6	7	8

1 ORANGEBURG
2 TOLLESBORO
3 CHARTERS
4 FLEMINGSBURG
5 STRICKLETT
6 HILLSBORO
7 PLUMMERS LANDING
8 CRANSTON

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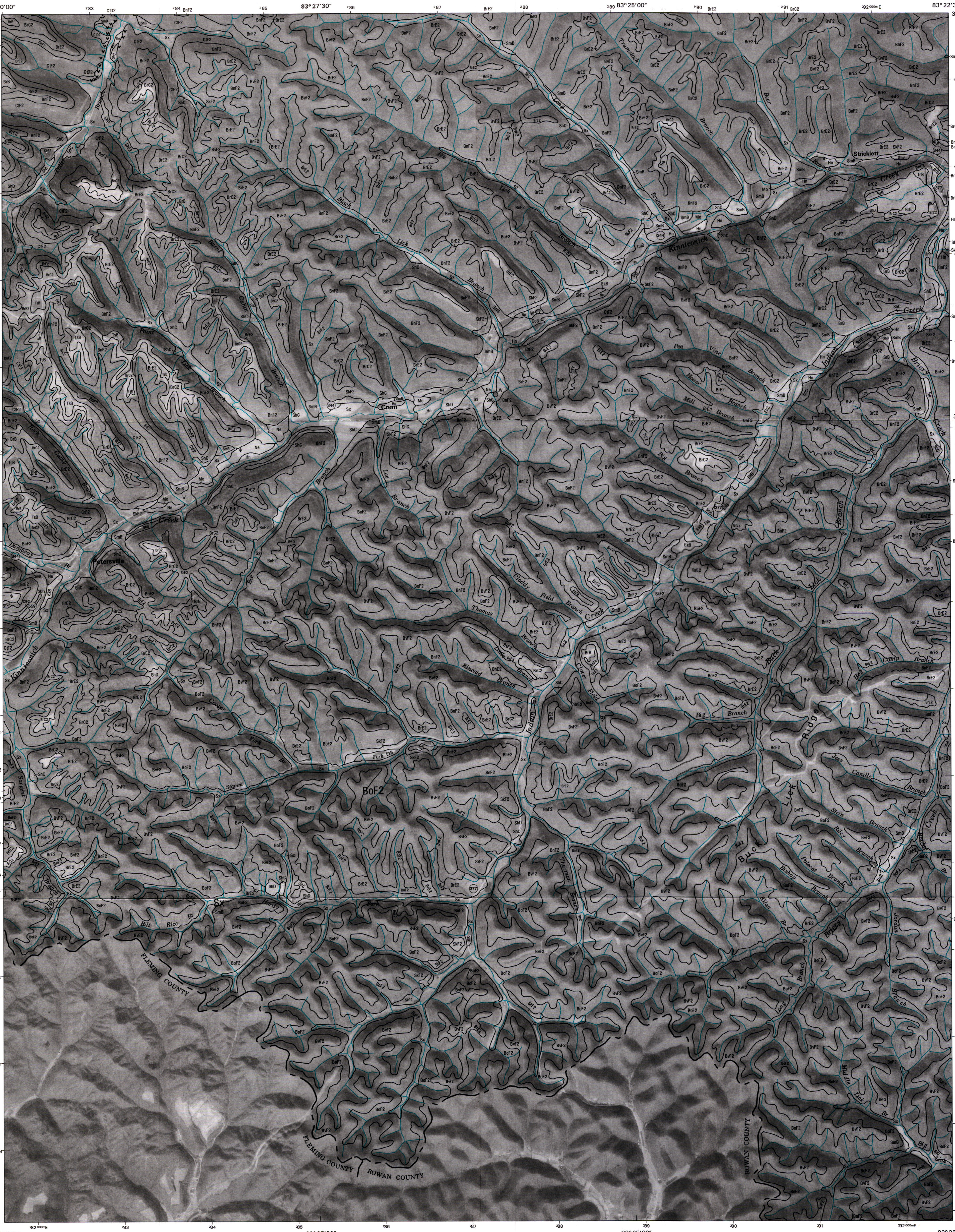
BURTONVILLE, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 13 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
STRICKLETT QUADRANGLE
SHEET NUMBER 14 OF 19



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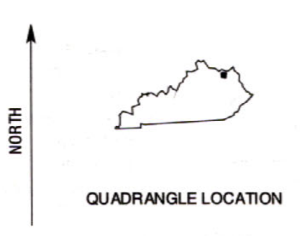
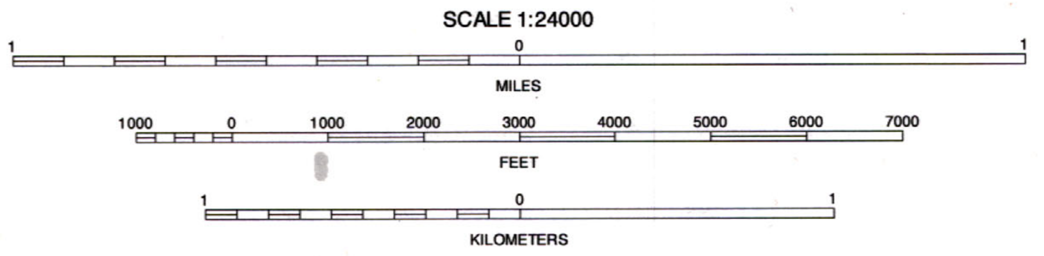
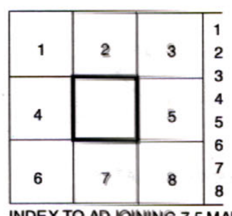
North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.







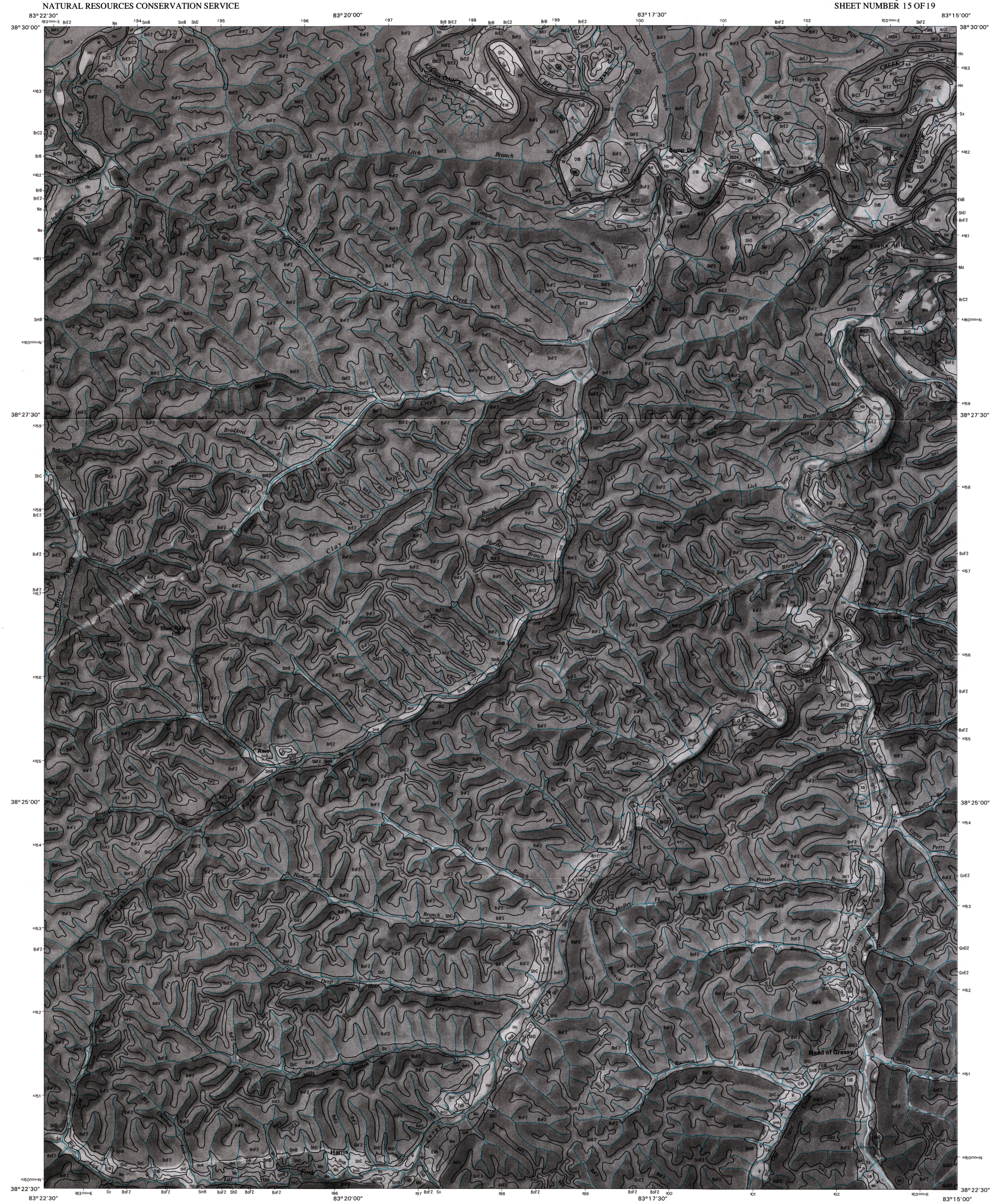
1 TOLLESBORO
2 CHARTERS
3 VANCEBURG
4 BURTONVILLE
5 HEAD OF GRASSY
6 PLUMMERS LANDING
7 CRANSTON
8 SOLDIER

INDEX TO ADJOINING 7.5 MAPS

STRICKLETT, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 14 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
HEAD OF GRASSY QUADRANGLE
SHEET NUMBER 15 OF 19



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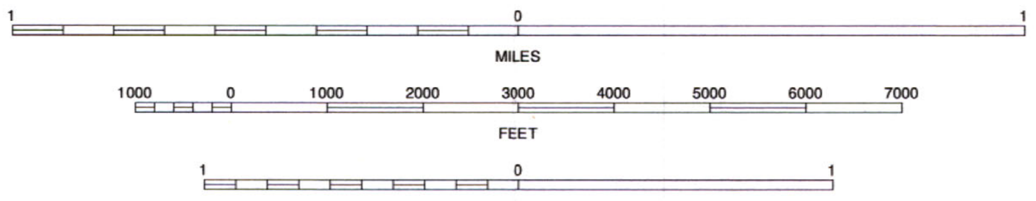
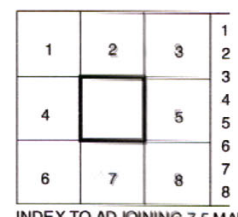
North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

SCALE 1:24000





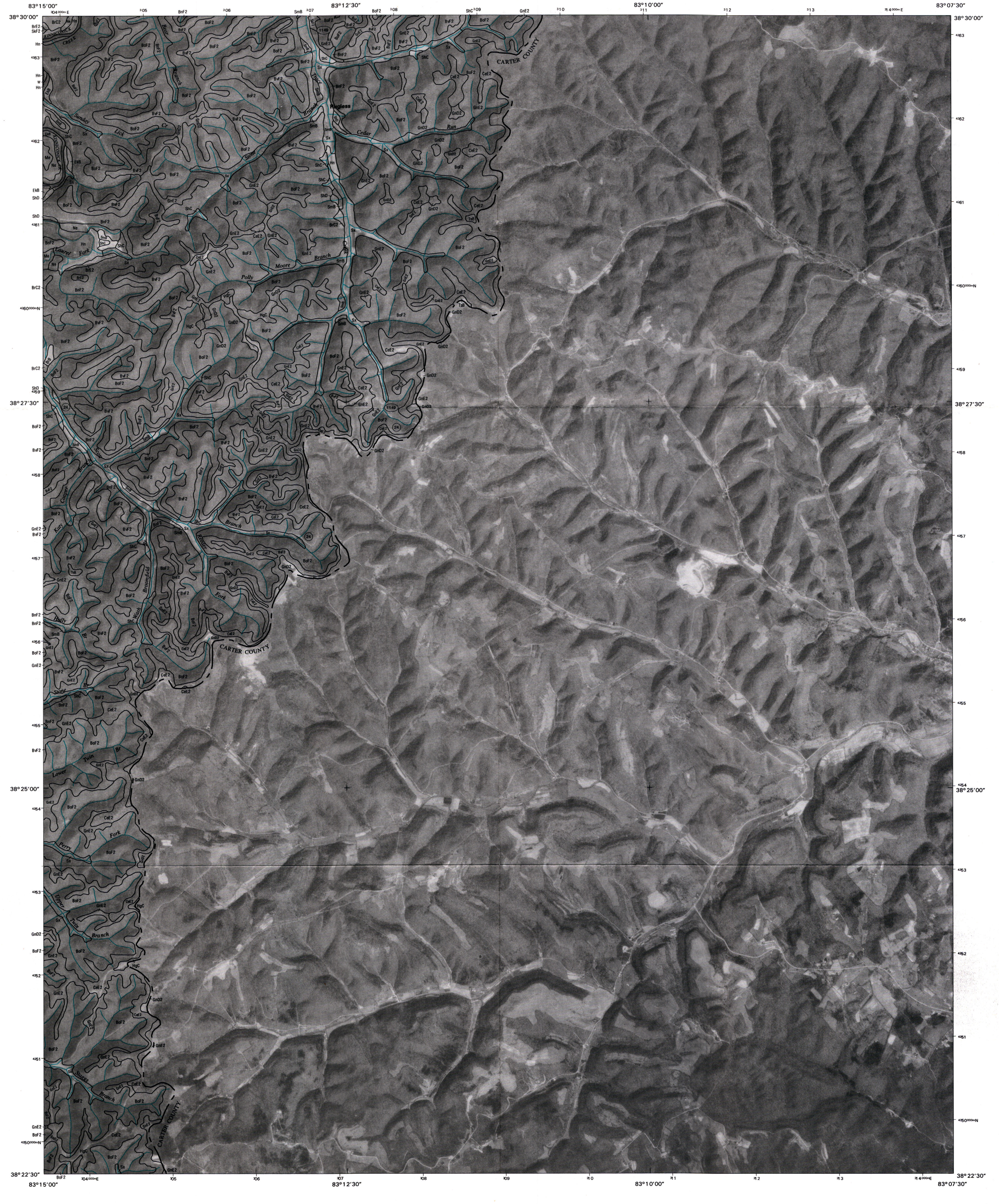
1 CHARTERS
2 VANCEBURG
3 GARRISON
4 STRICKLETT
5 WESLEYVILLE
6 CRANSTON
7 SOLDIER
8 OLIVE HILL

INDEX TO ADJOINING 7.5 MAPS

LEWIS COUNTY, KENTUCKY NO. 15

HEAD OF GRASSY, KENTUCKY

7.5 MINUTE SERIES
SHEET NUMBER 15 OF 19



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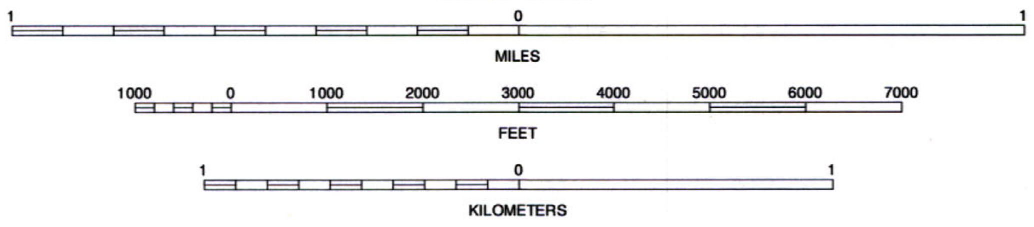
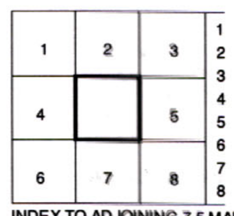
North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.





1 VANCEBURG
2 GARRISON
3 BRUSHART
4 HEAD OF GRASSY
5 TYGARTS VALLEY
6 SOLDIER
7 OLIVE HILL
8 GRAHN

INDEX TO ADJOINING 7.5 MAPS

WESLEYVILLE, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 16 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1 MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

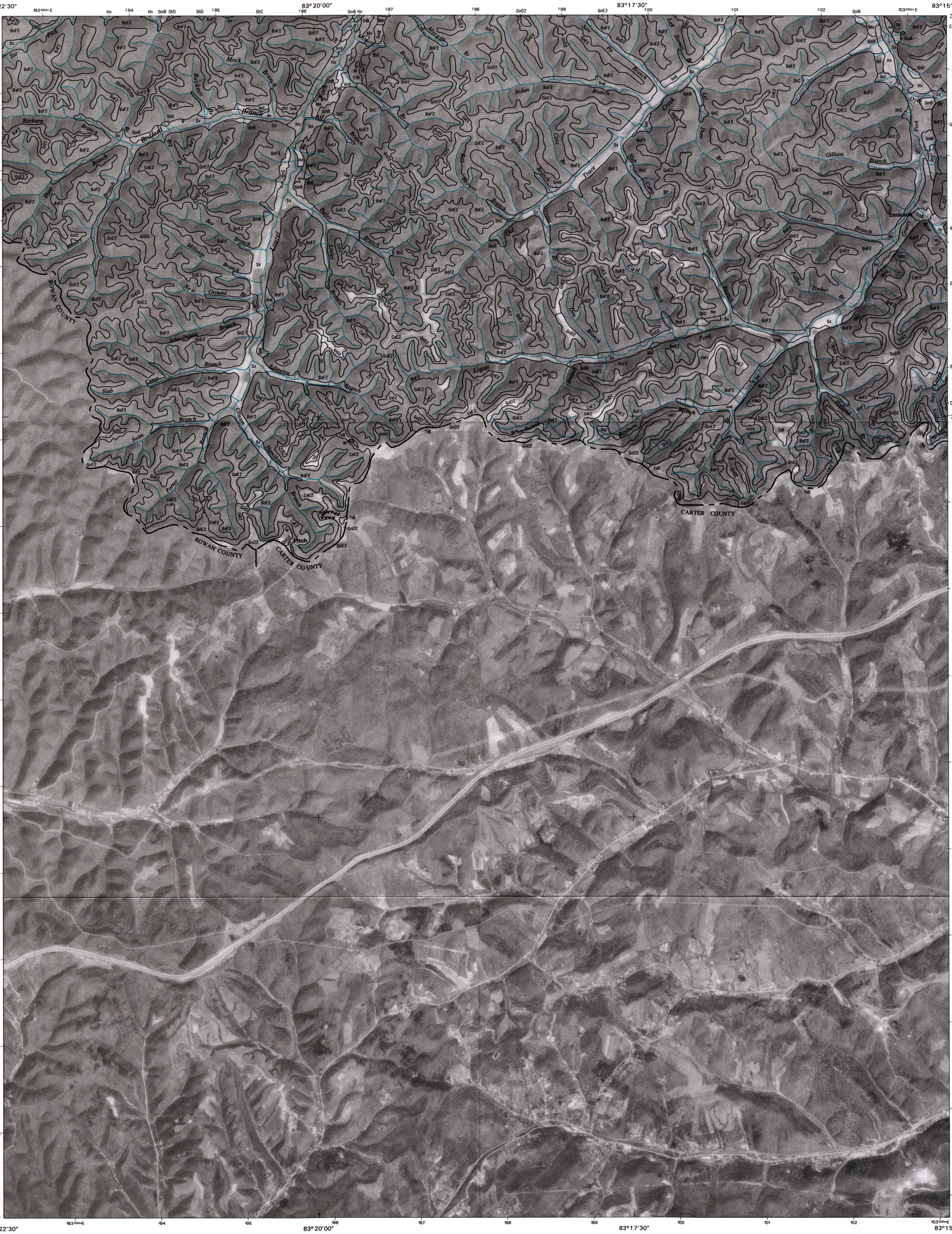
1 0 1 KILOMETERS

1	2	3
4		5
6	7	8

1 BURTONVILLE
2 STRICKLETT
3 HEAD OF GRASSY
4 PLUMMERS LANDING
5 SOLDIER
6 FARMERS
7 MOREHEAD
8 HALDEMAN

INDEX TO ADJOINING 7.5 MAPS

CRANSTON, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 17 OF 19



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1 MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETERS

1	2	3
4		5
6	7	8

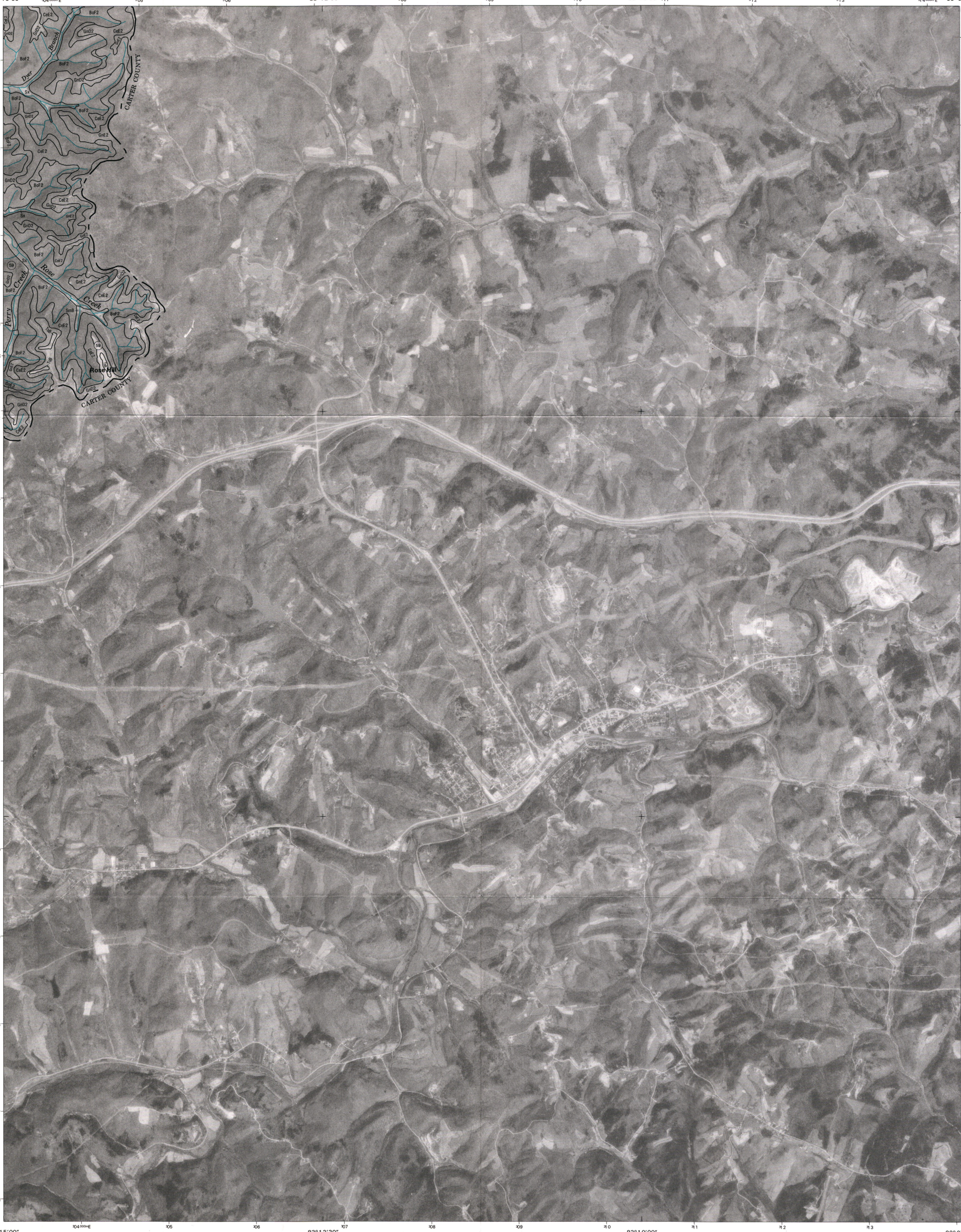
1 STRICKLETT
2 HEAD OF GRASSY
3 WESLEYVILLE
4 CRANSTON
5 OLIVE HILL
6 MOREHEAD
7 HALDEMAN
8 AULT

INDEX TO ADJOINING 7.5 MAPS

SOLDIER, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 18 OF 19

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

LEWIS COUNTY, KENTUCKY
OLIVE HILL QUADRANGLE
SHEET NUMBER 19 OF 19



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North American Datum of 1927 (NAD27). Clarke1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

1 HEAD OF GRASSY
2 WESLEYVILLE
3 TYGARTS VALLEY
4 SOLDIER
5 GRAHN
6 HALDEMAN
7 AULT
8 BRUIN

INDEX TO ADJOINING 7.5 MAPS

OLIVE HILL, KENTUCKY
7.5 MINUTE SERIES
SHEET NUMBER 19 OF 19